COAL AGE

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"There lived an old woman in Gath
Who threw her child out with the bath."

A nonsense jingle say you—satire say we.

For example:

You are one of the fellows who honor the scriptural injunction "Love thy neighbor as thyself." If your "buddie" goes broke, your purse is open to him, if he gets sick your time is at his disposal, if he meets with an accident in the mine you are willing to risk your life, if need be, to aid in his rescue, if he should die you take the lead toward giving him proper burial and his family may lean on you for advice and assistance at any time.

But—. Time and again you've been warned not to do certain things, you've been told that to do so is criminal carelessness; to make the thing more impressive, if possible, you've been told that 80 percent. of all accidents in mines are due to negligence and the greater percentage at that to the carelessness of others than the ones who are the victims. And yet in spite of all these facts, you become so self centered at times (like the woman from Gath), and so anxious to finish certain work that you throw caution to the winds and shortcut your tasks in spite of the danger to yourself and to others. Even if your own son be in the pit, you do not for a moment allow that fact to influence you.

Here's a paradox in human nature: Men willingly give hours of time to relieving distress, but often refuse minutes toward preventing it. Why? Probably because they do not realize what is required.

We've reached a point in safety-first campaigns where little more progress can be hoped for until some one hits on an effective way of making coal workers realize that the man who deliberately risks his own life is as much of an enemy to mankind as the one who is willing to commit murder.

If you cannot see satire written all over the "Gath" jingle, it's because you do not realize that it is possible for parents to become so self centered that they can forget their own children. The lesson of the satire is wasted because you refuse to see anything but the child and you insist that every mother loves her offspring. In fact, you take the same position that the average man takes when we load him down with "don'ts." He seems to think that we are trying to persuade him to love his neighbor and he resents this because he is positive that he does love his neighbor.

Let's carry the jingle illustration a little further. Suppose some "well meaning society lady" learning about the mother from Gath should swallow the jingle whole and decide to make a trip into Gath to educate the mothers of that country as to the sinfulness of throwing children out with the bath water. Would she be showered with gratitude? We think not.

Much well intended effort has been wasted on the miner. Let's not hold that against him. Nor should we despair. Surely men who are capable of the heroism displayed after most mine explosions will not balk at a few rules of discipline unless they are approached on the blind side.

IDEAS AND SUGGESTIONS

The Salaried Man

By Josiah Keely*

The word "hustle" has been worked overtime in describing American methods of doing things. For a long time the coal business was "hustled." Then "efficiency" came in for a large share of attention, and is still used in a vague sort of way to describe intelligent hustling. But in spite of improved machinery, new methods, and highly organized corps of officials, many people look back to the early days when the output was greater and the cost less.

You ask operators the reasons and they will tell you that other industries have attracted their good miners, that labor unions have taken away the individual efforts of their workmen, that there is a shortage of labor, that the quality of service has depreciated, and that much of the old time hustle has been absorbed in competition, all of which may be in part true.

Probably little is to be gained by reviewing the past, but the further back we go the nearer together we find the operator and the miner. In fact, we might say that in the beginning the miner was the operator, but the coal industry has developed until the operator is a syndicate and the system of operating is a collection of jobs at one end and a handful of miners at the other, with much lost motion among the holders of company positions.

Stockholders Are Interested in Dividends

The stockholders are naturally more interested in dividends than in coal; the managers are holding their positions by virtue of their ability to produce dividends; the heads of the departments draw salaries in proportion to their influence with various interests; the division superintendents sometimes visit the mines but oftener are more concerned with reports, high-priced experts are employed and are interested in the expertness of their own particular work.

When it comes down to the mine superintendent, he is the coal getter, but delegates his authority variously. He is supposed to be working under instructions—instructions from the heads of departments, instructions from the division superintendents, instructions from the experts, but always instructions. If he goes counter to said instructions and "gets away with it," he is often forgiven and sometimes promoted. If he disobeys and fails to accomplish results, off goes his head. If he follows instructions not wisely but too well, and conditions, or his manner of execution, preclude results, he is straightway marked for the guillotine.

The mine foreman and other job holders manage from day to day as necessity demands, sometimes complaining of breakdowns and lack of material, and sometimes anathematizing the lazy, perverse miners. It is the toiler whose efforts are cumulative that still sometimes manifests the traditional hustle. True, he looks forward to a season of rest when he may enjoy his accumulations, but he rarely feels that he has arrived at that goal.

On the other hand, the job-holder having this same dream of a period of ease, sooner or later imagines that the time has come for him to hold his position by virtue of long service. Your trackboss must at one time have been something more than the average wage earner, and, if his zeal had continued, he might have become assistant to the mine foreman; he may prove not even a good trackboss, he arrived after his first promotion.

The mine foreman has been a good workman, a good under boss, and starts in as a good pit-boss. Why, with this record, should he not get better? He has had a dream of rest, and, although he may be good enough to be retained for years, he has struck his gait as a job-holder and arrived.

The mine superintendent, of all men, must have at one time been a hustler. He has made good somewhere. He has had numerous promotions. He is a man with a record. The powers do not pick up just any sort of a man to experiment with as mine superintendent. He has now what most of his men consider the highest position to be attained. They have heard of the manager, but they see the mine superintendent in all his importance. He sometimes wears a white collar right on working days and calls the men of the main office by their first names. Then, why, in the prime of life, should he not make good and in turn be promoted?

Of course, there is the possibility of his having been overestimated, but the chances are that he has listened too often to the call of the job, has dreamed that dream of rest, and feels that, with family, with influence in the community, and with some association with the men higher up, he has arrived. He straightway sets him out a vineyard, plants a hedge; he takes unto himself horses, cattle and chickens. Feed is convenient, labor is handy, and the company store is well stocked with the necessities of life. He has perhaps served long and faithfully. He rests. True, he has activities; he may run a Sunday school, be a politician, a speculator, or a sport, but so far as the coal industry is concerned, he rests.

It is needless to follow the tendency up through bigger jobs where the vineyards and cows give place to automobiles and fine residences and where the innocent pastimes of peddling official influence and farming out company labor are forgotten in the excitement of big deals and subsidiary organizations.

The Toiler's Dream

Far be it from any of us to disclaim having listened to the call of the job, of having dreamed the toilers' dream, but when we pull apart the fabric of the modern coal syndicate with the job-holders at one end and the miners at the other, we are reminded of that old trick of the fragile woman of the circus, holding in one small hand the end of a pole which a dozen lusty farmer youths are trying to push down to the platform. The only sleight is that she has so arranged their hands on

*District superintendent, Acosta, Penn.

the pole that each is pushing against the other, while she holds the lever end.

Nor can we make any claim to astuteness in so characterizing one of the weaknesses of the efficiency struggle in our larger coal operations. It may not even be a new way of appealing to job-holders for more ambition, but we believe that while coal is now paying our salaries at a loss over the early days, it might be paying even better incomes and larger dividends, if officials from mine foremen to managers could put off a little further in the future that time of rest and try for one more promotion before listening to the call of the job.

Some Practical Short Cuts

By Alexander Franklin

State mining laws invariably specify that foremen shall have a certain number of years practical experience in the mines. This is, of course, a desirable provision, but it must be remembered that experience is, after all, but one requisite for a position of responsibility. If the foreman lacks initiative or does not possess a nimble and active mind, capable of devising ways and means for meeting the continual unprecedented emergencies, his experience will count for little.

An instance of this kind came to my attention recently. In making a change in the ventilating system of a mine, it was found necessary to cover an overcast. A job of this kind is often difficult to handle satisfactorily because of the insufficient head room available. In this case the foreman remembered a lot of old discarded pipe which he ordered placed over the opening and covered with a layer of cement. The job proved economical, permanent and satisfactory in every respect, in addition to which, it also solved the problem of finding a disposal for the old pipe. While apparently simple enough in itself, this is, nevertheless, a good example of the effectiveness of a little headwork.

In this same mine another incident occurred showing how important economies can sometimes be effected by a little careful thinking. As is well known, the Pennsylvania mining law requires that no rooms be turned ahead of the ventilation except with the special permission of the inspector. In this case the entrymen laid wooden tracks inside of the last crosscut and these were used until it became necessary to put in a switch at the next breakthrough inside. The wooden track was then torn up and replaced with steel, so that when the machines made their cuttings for the room neck, they stood so high on the new track that it was invariably necessary to pay yardage for taking up the bottom.

The plan was finally evolved of turning the room immediately the entry had been driven far enough to accommodate the new work without crowding. Permission was accordingly obtained from the mine inspector, and the new system tried and found to present advantages.

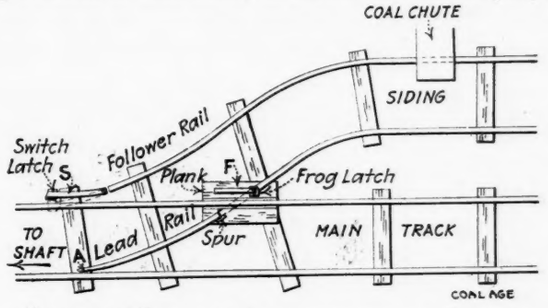
In the first place the machinemen took a "side swipe" at the room neck while they were unloaded to make the entry cut, thus giving them an additional cutting without making an extra move. The entrymen could also be loading out of the room neck while the machinemen were cutting the entry, which obviated this customary period of idleness. As the cutting was made on the bottom the usual yardage paid for taking this up was eliminated. And finally when the steel track was laid all the switches for the rooms could be located at the same time and this work completed at one operation.

Doubtless many others have had similar experiences as these. The examples cited are simple and embody conditions in the everyday working of a mine. Nevertheless, they show the enormous discrepancy that may occur through the lack of a little headwork.

To Expedite Loading Cars on Light Pitches

By Ralph W. Mayer*

Much time is often lost by the motorman being required to wait for the loading of cars where the pitch of the seam is so small that the inclination of the loading chute is not sufficient to cause the coal to slide rapidly into the car. In such a case, much time is saved by laying a switch at each chute, as shown in the accompanying



Showing General Arrangement of Switch

figure, so that the empty car can be set out on the switch.

In this arrangement, it is advisable to adopt a special form of switch that will leave the main track unbroken. Such a switch is shown in the figure. Instead of a frog there is a frog latch (*F*), which is pivoted on one end by a bolt. When swung into position across the rail of the main track, the other end of the latch is held in position by the spur shown in the figure, and is otherwise secured by a grooved plate spiked to the plank underneath the lead rail. The lead rail has a fixed point, as shown at *A*. The end of the lead rail at the frog latch is elevated sufficiently above the rail of the main track to accommodate the frog latch when laid across that rail.

The switch latch, on the follower rail, is also pivoted on one end by a bolt, as shown at *S*. When in position, this latch is swung over and laid on top of the rail of the main track where it is held in position by a slight projection on its underside.

This arrangement gives a clear main track, and the motorman is not required to wait while the car is being loaded. In most cases, a switchman cuts off the empty car at the switch, without the motor stopping. The miner then runs his loaded car onto the main track and sidetracks the empty car, which he loads at his leisure. The motorman returning gathers up the loaded cars standing on the main track.

The average annual earnings of all classes of labor in the mines of Germany in the year 1912 amounted to $340. In 1890 the average amounted to only $260, so that in the intervening 22 years, wages have increased a little over 30 per cent.

*Roslyn, Wash.

Tertiary Coal Fields of the Rio Grande

By B. L. Miller*

SYNOPSIS—The mines of the Laredo field are extracting at a profit coal which is from 24 to 30 in. thick. Prices of the fuel at the surface are three times those obtained for coal at Pennsylvania mines. The coal is not a lignite but has many points of resemblance to cannel coal.

The Southwestern portion of the United States and the greater part of Mexico have long been known to be markedly deficient in fuel supplies but until recent years this lack of fuel has been of little consequence. The small supply needed, when the country was occupied only by scattered ranchmen, was furnished by the scanty vegetable growth characteristic of semiarid regions. There were few towns of any considerable size and such as did exist contained no industries demanding large supplies of fuel, while the mild climate did not necessitate much artificial heat in the houses of the residents. Under these conditions the known deposits of coal occurring in these regions received little attention.

With the rapid industrial development which has recently been taking place in the Southwest a change has come and attention is being directed to new sources of fuel supply. Especially is this true in regard to southern Texas. Many new railroads have been built and more are projected and general agriculture is replacing the occupation of ranching which formerly was almost universal. The population is rapidly increasing and new industries of various kinds are being started, all of which require large supplies of fuel.

Fortunately for this district petroleum was discovered in Beaumont, Tex., some years ago and later in several other places in the same state and in Louisiana, while natural gas has also been found, although unfortunately in most places in rather small amounts. But the supplies of petroleum and natural gas from Texas and Louisiana have not kept pace with the increasing demand for fuel and southern Texas has been compelled to obtain large supplies of coal from Oklahoma, Arkansas, Colorado and New Mexico. The transportation charges on account of the long haulage, however, are excessive and would tend to discourage many industries. McAlester, Okla., coal retails in San Antonio at $10 per ton while crude petroleum is gradually advancing in price.

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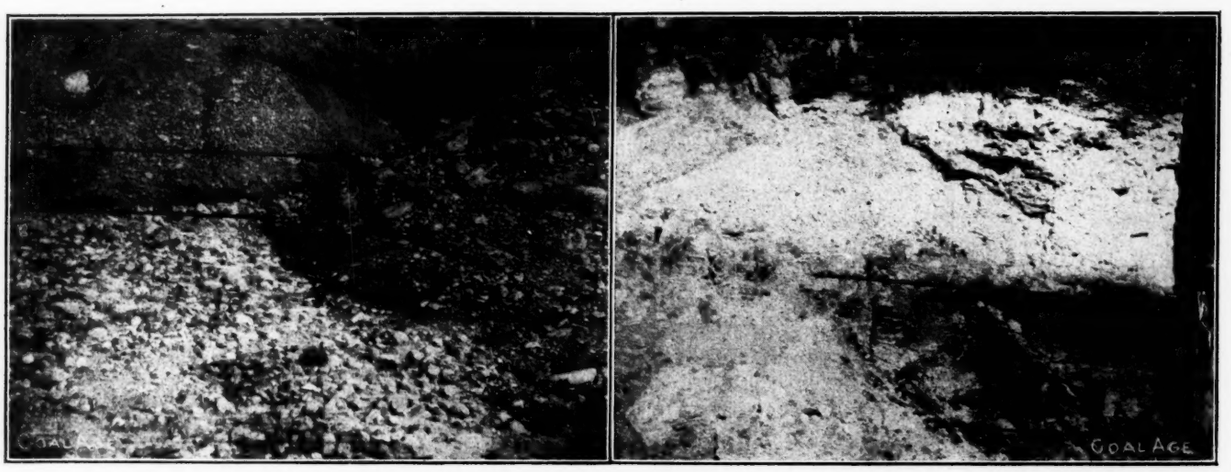
Coal of Three Geologic Periods

Despite these conditions, Texas has thus far failed to take advantage of some of her coal deposits, though they appear promising enough. The coal fields of Texas are varied in character and rather widely distributed. They belong to the Carboniferous, Cretaceous and Eocene geologic periods and represent all the gradations between soft brown lignites and a good grade of bituminous coal. The Carboniferous coal fields lie in the north central portion of the state about 150 miles northwest of Austin. The Cretaceous coal deposits are confined to a rather small area in the vicinity of Eagle Pass. Both the Carboniferous and Cretaceous coals are bituminous in character.



Outcrops of Coal along Espada Creek

The Eocene coal and lignite deposits are extensively developed in a broad belt extending across the state from the southwest corner of Arkansas to the Rio Grande. Except in Webb and Dimmitt counties all these carbonaceous deposits consist of lignite which has been worked in many different locations but not extensively in any one place. The supply is great but its deterioration in shipment has restricted it to local use. In Webb and Dimmitt counties, however, the Eocene contains deposits of a good grade of bituminous coal which possesses many of the characteristics of cannel. Only along the Rio Grande in the former locality has the coal been worked but it has been encountered in some well borings in the latter county. The purpose of this paper is to describe the geology of the Webb County coal deposits.

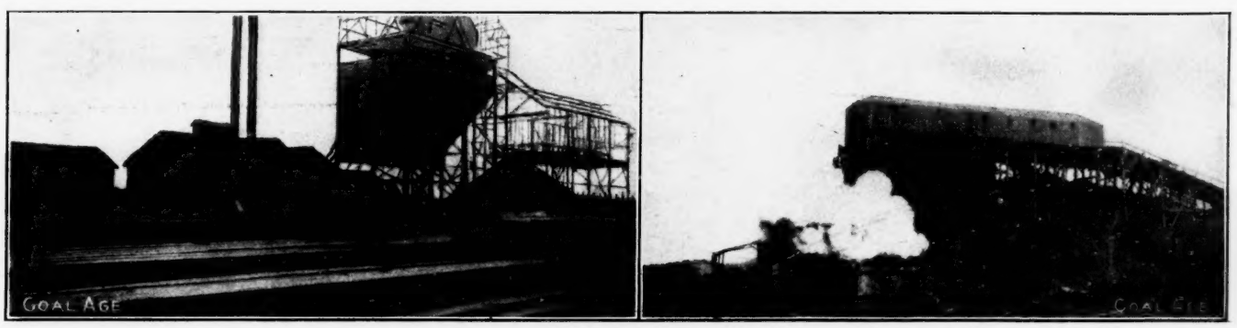
The Laredo Coal Field

The Webb County coal field borders the Rio Grande River and extends from a point about 15 miles above Laredo for a distance of 35 or more miles. The field is frequently called the "Laredo Coal Field" and a recent map

of the United States Geological Survey locates it along the International and Great Northern R.R., extending about 10 miles on either side of Laredo along the river. This is incorrect, as the coal field lies entirely northwest of the location mentioned.

The coal of this region has long been known. It was mentioned in the report of the United States and Mexico Boundary Survey published in 1857 and by early travelers in that region. No use could be made of the coal, however, until a railroad was constructed. About 25 years ago the Rio Grande & Eagle Pass R.R. was built from Laredo into the lower portion of the field and mines have been in operation there ever since. At the present time two companies are operating in the district. The Cannel Coal Co. has mines at San José and Cannel and the Santo Tomas Coal Co. is operating at Minera.

TYPICAL SCENES IN THE LAREDO COAL FIELDS



SAN JOSÉ MINE OF THE CANNEL COAL CO.

(New steel tipple now being erected at shaft.) (The old wood tipple with slope approach.)

The coal occurs in thin beds which outcrop in many places along the Rio Grande River and the creeks or arroyos that enter the river from the north. The country is semiarid and covered with a moderately heavy growth of cactus, mesquite and various other kinds of thorn-bearing plants. The arroyos that lead into the Rio Grande contain water in pools during most of the year but in order to obtain sufficient water for the cattle in the ranches, reservoirs (called tanks) are formed by the construction of dams across these waterways and the water impounded for use in the dry season.

THE ROCKS ARE NOT WELL CEMENTED

The principal rock of the region is a shallow-water cross-bedded, gray to buff sandstone that shows ripple-marked surfaces in many places. The grains of quartz are rather loosely cemented together and wind erosion is able to wear away the softer layers in exposed cliffs with ease. The harder layers are responsible for the flat-topped isolated hills that are seen in many places and also explain the rapids in the river. Interbedded with the sandstone layers are numerous beds of drab clay with occasional layers of ironstone and carbonaceous shale and coal. The clay contains much gypsum and on a clay slope crystals of clear selenite are abundant. Clay concretions both large and small are also common.

Limestone of a soft porous character outcrops in a few places several miles back from the river. Over almost the entire region with the exception of the steep slopes and the silt-covered river terraces there is a thin cover of quartz and quartzite pebbles among which are many pieces of petrified wood, jasper and chalcedony.

In certain places the Rio Grande is bordered by high bluffs of the Eocene sandstone and clays that are in many places about 100 ft. high. In most places, however, there are two fine-silt terraces bordering the river. One of these rises only about 20 ft. above the water while the other lies at an elevation of about 40 ft. higher. In many places the lower one has been cut away and in some places both are now absent. These silt terraces extend back from the river to a distance of several miles in some places. They have attracted much attention in recent years since it has been found possible to grow a fine quality of Bermuda onions in them by means of irrigation. The water is pumped from the river for the purpose.

THE FUEL PRODUCED IS NOT LIGNITE

The coal of the field has frequently been described as a brown coal or lignite. This is certainly not the case, as the coal has a luster and breaks with a glossy con-

choidal fracture. It contains much volatile matter and has an oily appearance similar to cannel coal. It also resembles that fuel in the way it burns and it may properly be called semicannel. Dumble likened it to hardened asphaltum.

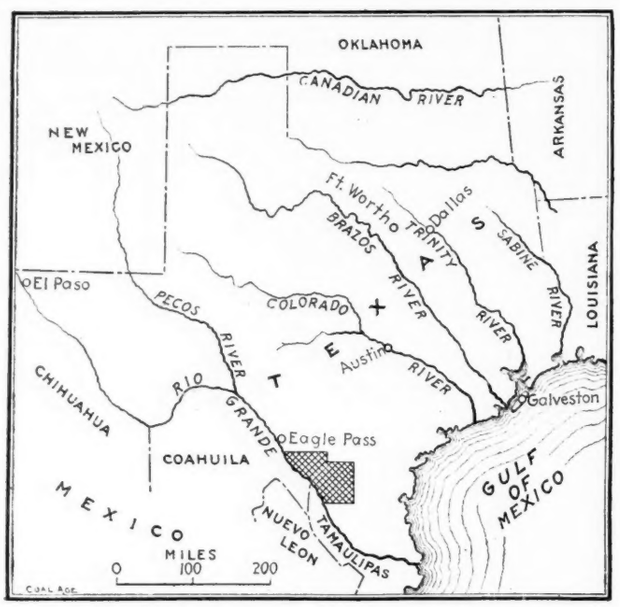
Thin seams of an intensely black glossy material resembling jet that breaks readily into angular fragments are occasionally found within the coal bed. On exposure to the air it weathers slowly and many of the outcrops show coal of a comparatively fresh appearance. It does not crumble readily so that there is little dust produced in the mining or shipping of the fuel.

The U. S. Geological Survey publishes the following analyses, made by S. H. Worrell, of the coal from two of the present working mines:

ANALYSIS OF COALS IN WEBB COUNTY, TEXAS

Proximate analysis, dry				Ultimate analysis, dry					
Moisture	Volatile	Fixed Carbon	Ash	Carbon	Hydrogen	Oxygen	Nitrogen	Sulphur	B.t.u. dry
2.30	54.00	37.97	8.03	71.04	5.65	10.03	3.00	2.25	12,604
2.80	50.45	38.10	11.45	66.06	5.72	12.18	2.50	2.09	11,740

The coal comes to the surface in the tributary arroyos of the Rio Grande for a distance of about five miles from their mouths. A dip of about 1 deg. to 2 deg. northeastwardly causes the coal beds to disappear from view farther to the northeast. The strike of the coal beds



THE STATE OF TEXAS, WITH WEBB COUNTY CROSS-HATCHED

and associated sandstones, while not constant, is approximately parallel to the course of the Rio Grande.

The coal outcrops in a few places on the Mexican side of the boundary and an attempt was made to mine it at one time at a point opposite Minera. Much money was expended in building a railroad from Nuevo Laredo and in equipping a plant but the coal bed was found to dip beneath the river and not to be present on the Mexican side in sufficient quantities to permit operation.

In most places there are several beds of coal, the thicker ones of which are continuous over large areas. The thinner beds are less persistent and in places can be seen to die out by passing into carbonaceous shale. Occasionally thin lenses of shale are also encountered within the coal bed but these are seldom persistent or thick.

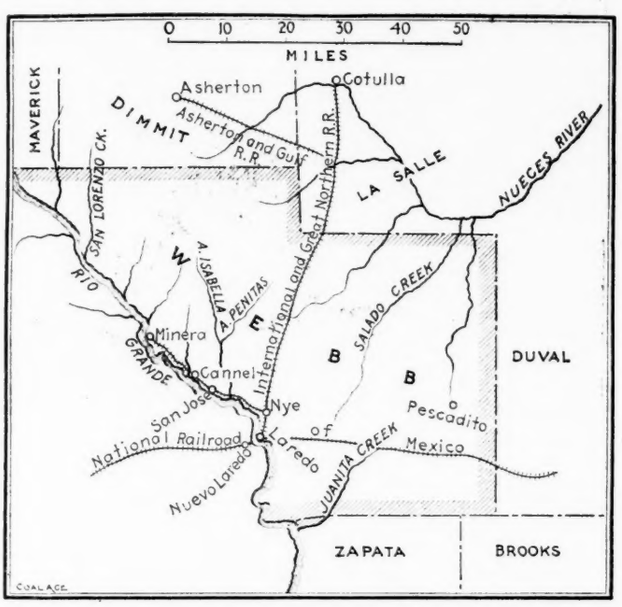
SLICKENSIDES IN ROOF AND SMALL FAULTS IN COAL

The roof of the coal is in most places a clay or clay shale, drab to black in color, and varying from a few inches to a few feet in thickness. Gray sandstone in most cases lies a few feet above the coal bed. The clay does not make a good permanent roof, as it tends to scale off and fall. In the working rooms of the mines few supports are used but considerable timbering is necessary in the entries.

The region has undergone some disturbance as shown by occasional normal faults, which are always small, the throw being seldom more than 1 or 2 ft. The largest fault observed was in the San José mine, and had a throw of about 4 ft. 6 in. In the vicinity of the faults the overlying clay layer shows much slickensiding, which makes the roof fall readily. But even in such places when the coal is blasted down, the roof does not fall with it so that as the coal as mined is unusually free from any adherent impurities.

THIN COAL AND HIGH PRICES AT TIPPLE

The coal beds are thin in comparison with those of the Eastern fields, and it would seem that they could not be



WEBB COUNTY, TEX., WHERE THE CANNEL COAL FIELD IS LOCATED

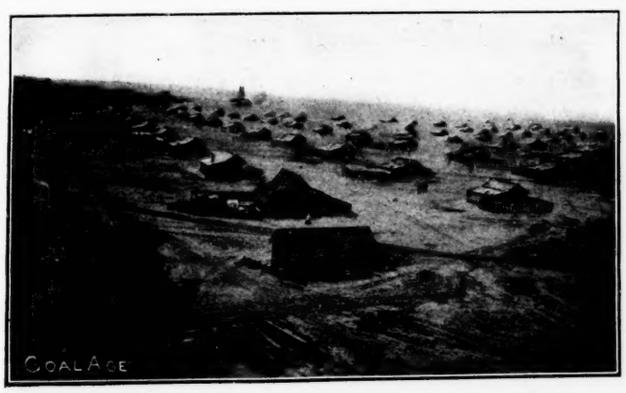
worked with profit. When it is realized, however, that the Rio Grande coal at the mouth of the mine readily sells for three times as much as the best grade of bituminous coal in the coal fields of western Pennsylvania and West Virginia, and that the demand for it exceeds the supply it will readily be seen that the thickness demanded for profitable operation in western Pennsylvania is no criterion for southern Texas. The beds seldom contain more than 30 in. of clean coal, while most of them now worked scarcely exceed 24 in. In all probability beds considerably thinner can be worked with a fair margin of profit.

The mines at San José, the most easterly portion of the present working field, may be described as being typical

of the region. At this point the Cannel Coal Co. is working two beds, one of which lies 70 ft. below the silt-covered bottom on which the town is built and the other lies 90 ft. lower. The upper bed is worked by means of an incline and shaft. A new steel tipple is just now being erected at the latter. This shaft is 216 ft. deep, and when it is completed both beds of coal will be worked from it. The thickness of the upper bed averages about 27 in., and that of the lower one about 24 in. The coal in the two beds is similar, the only essential differences being the presence of fewer faults in the lower bed.

Working Conditions

The mine is operated by the room-and-pillar method, but it is planned to work the lower bed by the longwall system. The pillars vary from 40 to 80 ft., nearly all of which coal is recovered on the retreat. The mine is comparatively dry. Gas gives no trouble, and, consequently, little attention has been given to ventilation, with the result that parts of the mine are hot. Many of the miners wear only a cap and overalls while at work.



The Primitive Coal-Mining Town of San José, Tex.

The mine is provided with electric haulage. The coal is hauled up to the top of the tipple where any pieces of slate that may have been included with the coal are picked out by hand as the coal is carried forward by a belt conveyor.

Mexican labor is used in the mines almost exclusively, and, on the whole, is fairly satisfactory.

As stated above, the present working coal mines of the Rio Grande are few in number and located near the eastern side of the coal basin. So far as it can be determined by the outcrops, coal of equally good quality and of approximately equal thickness is believed to underlie a much greater area farther up the river, and it is to be hoped that the working field will be extended so that the fuel situation in south Texas may be relieved.

The Fuel Resources of North Dakota

The production of lignite coal in North Dakota in 1912, according to E. W. Parker, of the U. S. Geological Survey, amounted to 499,480 short tons, valued at $765,105, compared with 502,628 short tons valued at $720,489 in 1911, this being the maximum output in the history of the state. The decrease of 3148 short tons in 1912 was so small as to possess no significance, while the increase of $44,616 in the value of the product indicates a satisfactory condition of the trade.

On account of its heavy percentage of moisture and rapid disintegration on exposure, lignite does not stand transportation well, and, consequently, its field of usefulness has been thus far limited. Its principal use has been to supply fuel to the settlers on the treeless plans in the western part of the state. For that purpose it has been mined in a crude way in almost every county in the lignite-bearing area. Commercial mines are situated on the lines of railway, and supply the towns of the state with fuel for domestic purposes and for use under steam boilers.

Lignite has, however, been found to be an excellent fuel for the generation of producer gas, and with the development of the manufacturing industries of the state, the extensive deposits of lignite in North Dakota will receive more attention as a source of power. It has been found that one ton of lignite in the gas producer will yield as much horsepower in internal-combustion engines as one ton of the best bituminous coal under boilers. As the gas producer and internal-combustion engine in large units come into more general use in the West as they are rapidly doing in the East, the hundreds of billions of tons of lignite known to underly North Dakota will be found to possess great potentialties in the settlement and economic development of the state.

Machinery at Panama Exposition

The idea governing the selection of exhibits in the machinery department of the Panama-Pacific International Exposition, which is to open on Feb. 20, 1915, is that they shall represent present-day practice and not be historical in character.

At the St. Louis exposition an extensive series of tests were carried out on gas producers, using lignite coal, and internal-combustion engines using this gas, the results of which were published by the government and were of interest to engineers.

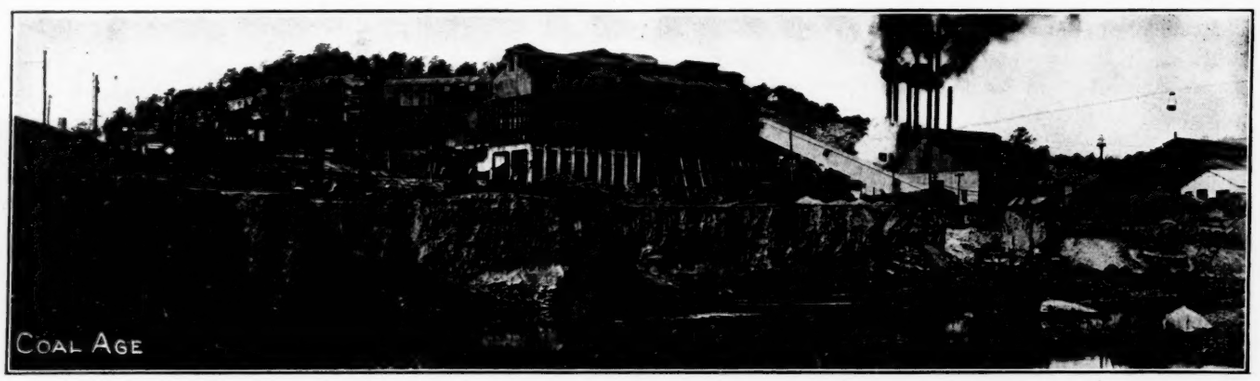
At San Francisco it is intended to show the latest development of the steam turbine which was really the first kind of a steam engine to be invented, having been first built by Hero of Alexandria before the Christian Era.

The Diesel engine is also to be exhibited. This engine uses the heavy fuel oils, such as are produced in California. The power is obtained by injecting the oil into the cylinder after the air has been compressed to such an extent that its temperature has been raised above the ignition temperature of the oil. The thermal efficiency has reached 30 to 32 per cent., which is 2½ to 3 times that of the more economical types of steam engines.

It is hoped that an engine being tried out in England may also be exhibited. This engine gets its power from producer gas made from powdered coal, which is fed by a worm through tubular passages within the cylinder head, being heated at the same time by the exhaust gases.

The authorities of the exposition have been promised an exhibit of the Humphry gas pump, in which the expansive force of the exploded gas in each end of a V-cylinder acts on the water held in the curved part. A pump of a capacity of 50,000,000 gal. daily is now supplying water for London, and one pumping 150,000,000 gal. per day is to be installed in Germany.

SNAP SHOTS IN COAL MINING

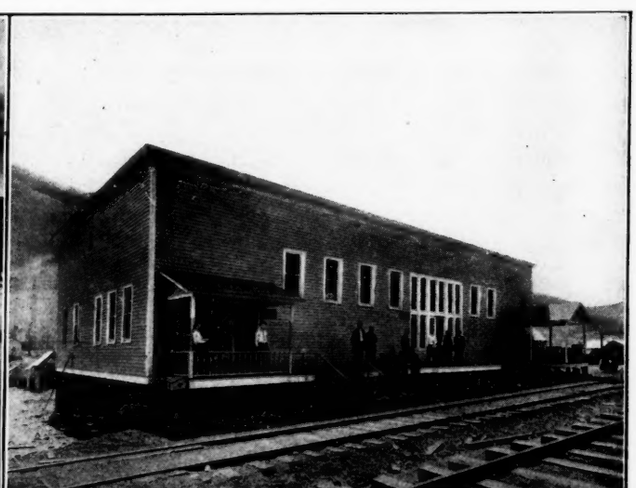


GENERAL VIEW OF THE COKEDALE WASHERY, TIPPLE AND POWER HOUSE, COKEDALE, COLORADO

STREET OF 20 FIVE-ROOM HOUSES, WITH HOT AND COLD WATER, BATH ROOM AND ELECTRIC LIGHTS, HOLDEN, W. VA.

SHOWS THE COMMODIOUS CLUBHOUSE OF THE CONTINENTAL COAL CORPORATION, AT STRAIGHT CREEK, KENTUCKY

INTERIOR OF COMPANY STORE, BELONGING TO THE CONTINENTAL COAL CORPORATION, AND LOCATED AT ARJAY, KENTUCKY



SHOWING AN EXTERIOR VIEW OF THE SAME CONTINENTAL COAL COMPANY STORE ILLUSTRATED ON THE LEFT OF THIS PHOTO

Tipples of the Allegheny River Mining Co.

SYNOPSIS—Only three men are needed on top to operate each tipple though all are equipped with two dumps. The cars are pulled forward by power, and run by gravity to a bumping block. They are freed automatically from the latter one by one and proceed by gravity to the dump, where the coal is discharged and the car passes on to the kickback.

Three tipples of the Allegheny River Mining Co. in the western Pennsylvania district were equipped last year with mechanical devices for easy and precise delivery of loaded mine cars, one at a time, from the "trip" on the tipple approach, to and onto the "dump."

This work is done by two separate devices of a simple nature, a trip puller at the tipple entrance and an automatic stop and feeder just before the dump. The operation is rapid and economical of labor, and is conducive to safety of man and dump by keeping the cars always under perfect control.

The three mines outfitted in this way are the Chickasaw, near Rimerton; the Seminole, near New Bethlehem; and the Conifer, near a town of the same name, in Jefferson County. The Chickasaw and Seminole tipples were built to use the car-handling system, while at Conifer the equipment was installed in an old tipple, thus proving its adaptability to old as well as new equipment.

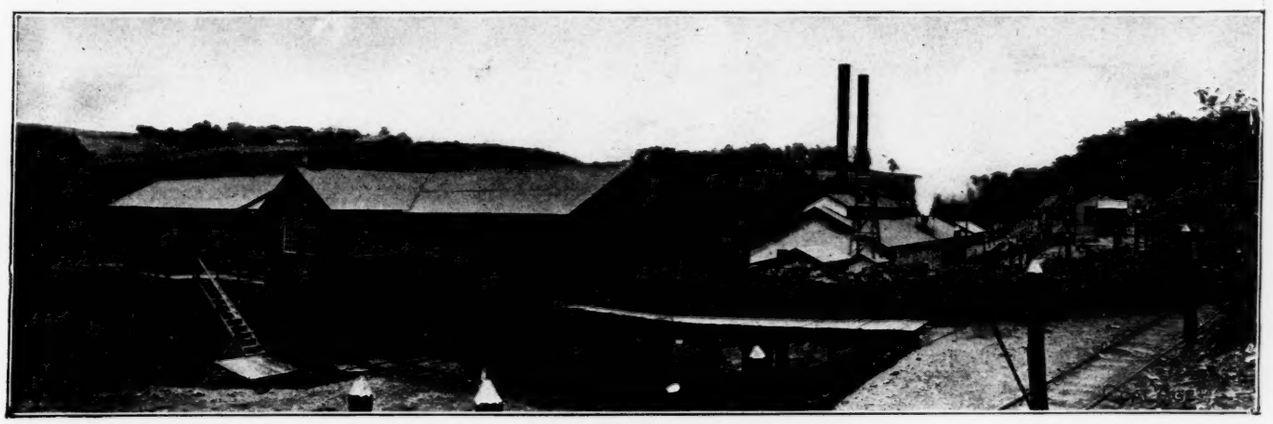


FIG. 1. TRIP ENTERING TIPPLE AND ABOUT TO BE DRAWN FORWARD BY THE TRIP PULLER

The illustrations show only the Chickasaw and Seminole tipples, which are essentially similar in arrangement and equipment. Both are double, with two dumps and corresponding sets of car-handling devices.

THE LOADED TRIP CAR PULLERS

Electric locomotives bring out trips of loaded mine cars and leave them on the double tracks of the tipple approach, Fig. 1. Thence they are drawn slowly forward onto the tipple floor, Fig. 2, by the trip pullers, one for each track. Here the attendant uncouples the cars so that as they pass the pullers they may run forward by gravity to the stops at the dumps.

Each trip puller consists of a strand of steel-bar link chain, of 12-in. pitch, carrying every 10 ft. a roller-supported dog of the knockover type, to engage the car axles. Both are driven from one 25-hp. motor and a main headshaft. Between the motor and the headshaft is a Webster steel-plate friction clutch, operated by a lever conveniently within reach of the attendant. Independent control of each puller is provided by a clutch in its geared drive from the main headshaft.

The pullers are each 19 ft. long on centers of sprocket wheels and are designed to haul trips of 40 cars, delivering them at the rate of four per minute. This gives, for the two tracks and dumps, a capacity of 480 cars per hour.

AUTOMATIC STOPS AT THE DUMPS

The cars released from the pullers run forward toward the dumps, but are checked by spring stops at the feeders. The number of cars held back by the stops may be as many as the space ahead of the pullers will permit. At the Allegheny River tipples, this distance is ample for several wagons.

The forward car is held by the stops while its predecessor is dumped. The dump operator releases the loads one at a time, each loaded car running forward by gravity, bumping the empty ahead off the dump and taking its own place there ready for dumping.

The incoming car depresses two triggers and thereby closes the bumping blocks in time to check and hold the car. The parts remain latched in this position until the car is to be released.

This may be done automatically or by the dump operator, by throwing a lever which opens the bumping blocks and raises the triggers. The car is then free to run forward, and the feeder is in form to check the next car.

INCREASED CAPACITY WITH REDUCED LABOR

The savings possible by use of this mechanical equipment are numerous. Actual operation requires only three men for a double tipple, one at the trip puller and one at each dump. At the Conifer mine, the installation of the one trip puller and two car feeders in the old tipple enable the company to operate with five less men than formerly.

By regularity and reliability of car handling the dumping capacity of the tipple is increased and a larger mine output thereby made possible. The feeder protects both the dump and the men from being injured by uncontrolled cars. Car feeders of this type are equally ad-

vantageous for caging cars in shaft mines, the operation being substantially the same as on the tipple floor. These feeders are patented by Dempey-Degener Co., Pittsburgh representatives of the Webster Manufacturing Company.

Belt Conveyor for Boiler Fuel

At each of these two new mines there is a Webster feature of interest—the conveyor for delivering slack coal from the tipple to the boiler room for steam fuel.

Slack from the tipple screens is delivered (by an inclined flight conveyor at Chickasaw) to a 14-in. belt conveyor, which extends through a covered runway, to the boiler house. A tripper, traveling an overhead track, may be set to take off the coal at any point and spout it to piles on the floor in front of the boilers.

The arrangement is simple in the extreme, and correspondingly easy of operation. The flight conveyor and the belt are both driven by one motor, which is controlled by the fireman. The coal is fed to the flight conveyor from a bin, kept filled by the tipplemen. Thus the power plant has its full supply always available, and the tipplemen can maintain the supply at convenience.

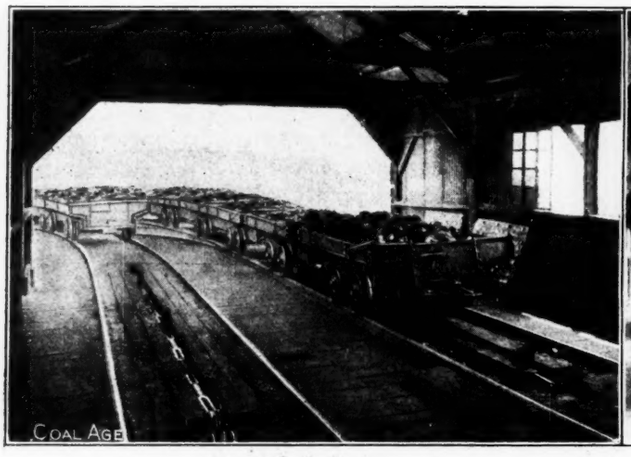


Fig. 2. Two Trip Pullers; One in Action

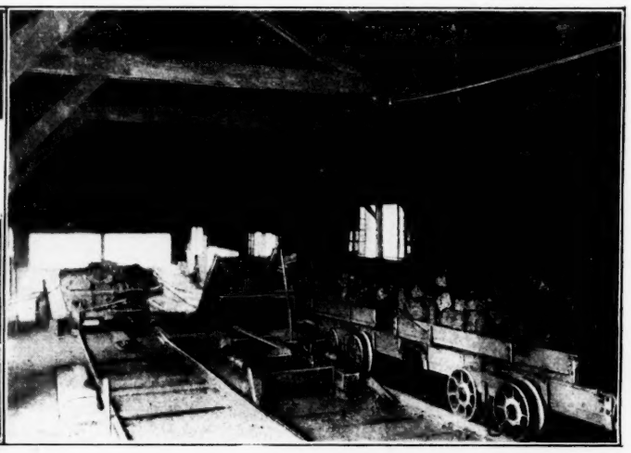


Fig. 3. Bumping Blocks, Car Feeders and Dumps

Large Acreage Restored to Public Domain

Six million acres of withdrawn public land were restored to entry during the months of May and June, upon approval by the Secretary of the Interior of the recommendations of the U. S. Geological Survey. This action was the result of examination and classification of the lands by the survey, those restored either having been found not to be valuable for power sites, reservoirs, coal, phosphate or potash deposits, or having been definitely valued as coal lands and rendered available for purchase under the coal-land law.

The total outstanding withdrawals on July 1 in all the public-land states amounted to 68,609,289 acres, of which more than 58,000,000 are in coal-land withdrawals. These lands are held pending classification by the Geological Survey, and as rapidly as they are found to be mineral bearing, they are either valued and placed on sale, as in the case of coal lands; definitely reserved pending appropriate legislation by congress to provide for their disposition (as in the case with potash or phosphate lands) or held subject to development, under departmental regulations (as in the case of water power or reservoir reservations); or if they are found to be nonmineral in character, they are restored to public interests. This work of valuation and classification is being prosecuted rapidly by the Geological Survey.

Advantages of the Steel Tie

Speaking at the West Virginia Coal Mining Institute, J. C. Evans summarized the advantages of the steel tie as follows:

The cost is less for steel than for wood ties when length of life is considered as well as first cost. It makes possible the use of the jumper rail. The track is kept true to gage, and the rails bend less under the load. As the rail rests on the floor, additional height is provided for the mine cars. No spikes or splice bars are required. The miners rarely object to laying their own track when steel ties are used and so save expense and delay. They are more willing to remove these ties when drawing pillars. When the cars are derailed they are more easily retracked. As a motorman can place enough ties on a car in a few minutes to support the rail in a room from end to end, both time and labor are saved by their use.

When the coal is thin, steel ties pay for themselves by reducing the necessity of taking up bottom or ripping top. No track gage or other tools are required except an axe and in one mine not even this is used. The difficulty of swinging a hammer makes it hard to lay track with wood ties in low coal. The wedges for steel-tie tracks are driven by a horizontal blow and lack of height is no drawback. Fewer ties are required. Steel ties last indefinitely while wood ties are seldom used more than twice. Reports show that the ties have been used six years with the percentage of loss small; practically none were worn out. Steel ties form inventory items, because they can be used again and again. Experienced trackmen are not needed to lay them. Steel ties take less storage room than wood and a miner can carry six at one time without special effort. The track can be laid and lifted in one-fourth of the time required to lay or lift track resting on wood ties.

Official Call for Meeting of the American Mining Congress

To bring about a better coöperation in the production, distribution and use of mineral wealth through discussion and deliberation, the Sixteenth Annual Session of the American Mining Congress is hereby called to meet at Philadelphia, Penn., October 20-24, 1913.

The convention will be composed of the members of the American Mining Congress, specially invited guests and duly accredited delegates appointed under the authority hereby extended for the appointment of delegates, as follows:

The President of United States may appoint ten delegates at large;

The Chief Executive of foreign nations may appoint ten delegates;

Governors of States and territories may each appoint ten delegates;

Mayors of cities and towns, Boards of County Supervisors, Boards of Trade, Chambers of Commerce, Mining Bureaus and Exchanges, Mining Organizations, Scientific Societies, Engineers' Associations and State Mining Schools, may appoint two delegates each.

We respectfully urge the early appointment of delegates on the basis above specified and that the name and postoffice address of each delegate so appointed be forwarded to the Secretary at 1031 Land Title Building, Philadelphia, Penn., at the earliest date possible, in order that such information may be furnished as will enable the delegate to consider in advance the subjects to be discussed and be better prepared to speak with intelligence and effect.

THE AMERICAN MINING CONGRESS.
By order of the Executive Committee.
DAVID W. BRUNTON, President.
JAMES F. CALLBREATH, Secretary.
Philadelphia, Penn., Aug. 15, 1913.

Difficulties of Mine Inspection

A number of instances have recently occurred that emphasize in a peculiar manner some of the difficulties encountered by mine inspectors who attempt to faithfully perform the duties of their office. The pathway is beset by numerous obstacles and pitfalls. The situation is a three-cornered proposition, involving the operator, the miner and the mine inspector, to say nothing of organizers working more for their own selfish ends than to safeguard the lives of miners or to increase the production of coal.

It is recently reported that charges are to be preferred by certain coal operators against State Mine Inspector Thomas H. Shaw, Midland, Ark. It is rumored that certain high officials of District No. 21, U. M. W. A., preferred another candidate than Mr. Shaw; and his recent appointment as state mine inspector has failed to meet with their approval. It is proposed fo secure an injunction to restrain the mine inspector from officially exposing the true conditions existing in the mines of the state. We are glad to note that Mr. Shaw will stand by his guns and, as an honest man, invites investigation, depending on his 28 years of mining experience. The better class of miing men fully indorse his administration, believing that it will result in minimizing the loss of life, and increasing the health of the miner, while insuring the greater protection of mining property.

Recently this fearless mine inspector closed three mines and condemned two mining camps, owing to the unsanitary conditions existing therein. The closing of the mines, by order of the mine inspector, resulted in the matter being brought to the attention of the State Board of Health, and a conference was arranged between the state authorities, the operators and the miners. State Labor Commissioner J. C. Clary and Drs. Smith and Myers, respectively state and county health officers, approved the action of the mine inspector; and the conference resulted in a new light being thrown on the operation of mines. It was promptly agreed by the mine officials that the operators will coöperate with Inspector Shaw, and abide by his decision and action in improving conditions in the mines; the sanitation of the camps and water-supply. The meeting was harmonious in every respect, and productive of much good.

Two of the mines closed belonged to the largest companies operating in Arkansas, namely, the Central Coal & Coke Co., operating mines in Arkansas, Kansas, Missouri, Oklahoma and Wyoming; and the Western Coal & Mining Co., operating mines in Arkansas, Kansas, Illinois, Missouri and Oklahoma. The mines closed were shaft mine No. 26, Bonanza, and shaft mine No. 17, Jenny Lind, belonging respectively to the two companies just named; and a slope mine at Hartford, belonging to the Bolen-Darnell Coal Co.

Following are copies of notices sent by Mine Inspector Shaw to the mine operators, firebosses and miners, throughout the state.

TO MINE OPERATORS:

You are hereby notified that two entries must be made in compliance with the Act of Arkansas No. 225, Section 7, which reads as follows:

The owner, agent, lessee or operator of any coal mine in this state, if said mine is worked on the room-and-pillar plan, shall cause such work to be prosecuted in such mine in the following manner, to wit: Two entries parallel with each other must be driven for the ingress and egress of the air, and crosscuts must be made at intervals not to exceed forty feet apart. Where gas exists they shall be driven thirty feet apart or a crosscut be made at any other place ordered by the management. No room shall be turned inside the last crosscut.

Also Section 10, of same Act, which reads as follows:

DUTIES OF FIREBOSS:

In all mines where a fireboss is employed all working places and worked out places adjacent to working places shall be examined when it can be done, at least once a day, by a competent fireboss, whose duty it shall be to enter a report of existing conditions of such working place or worked out place, in a well bound book kept by him for that purpose, and all dangerous places that are marked out, shall be marked on a blackboard furnished by the company before any other employees enter the mine.

Also see Section 11 which provides that nothing but pure lard oil, where oil is used for lighting purposes, shall be used in any underground works in the main upcast, this section shall not apply to rope riders.

All violations of this act will be prosecuted.

TO MINERS:

All drill dust must be removed from the vicinity of shots and crosscut entries and all air courses must be made not less than seven feet wide. I have notified all mine foremen to not pay for such places unless these orders are obeyed.

TO SHOTFIRERS:

Do not fire any shots where a miner leaves drill dust. Refuse to fire shots in any dusty entry until the mine manager has the dust cleaned up and entries sprinkled. Refuse to fire any shots which you consider dangerous. I will stand between you and the company or the miners' organization in the matter of obeying this order.

THOMAS H. SHAW,
State Mine Inspector.

Midland, Ark.

Coal Shipping on the Great Lakes

By John W. Chamberlain*

SYNOPSIS—This article discusses the development of the coal shipping in detail on the different Lakes. Rail fuels are aggressive competitors at Lake Michigan ports but are practically negligible in the Lake Superior markets; the water movement into the Northwest is increasing rapidly.

Before leaving the subject of coal docks and other loading appliances it might be well to go over the outlay necessary to construct a water trestle, which is essentially the reason for the move to dispense with them. The trestle of the Philadelphia & Reading Coal & Iron Co., at Buffalo, the newest and presumably the most modern of all, required 180,000 cu.yd. of dredging, 38,000 lin. ft. of piling, 2,750,000 ft. board measure, of white pine and 360 tons of spikes, bolts, etc. It was built in 268 working days, is 1805 ft. in length, has 1316 ft. of water frontage, is equipped with 80 pockets of 6000 tons storage capacity and is capable of loading 10,000 tons daily.

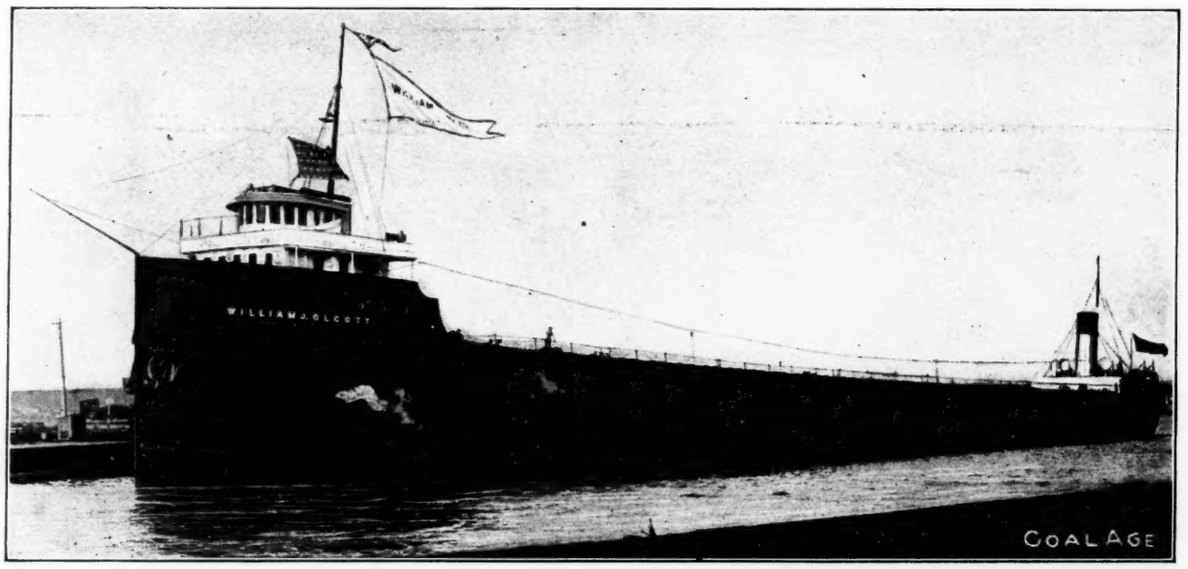
The cost of handling is a vital problem and the recent inventions used in the iron trade are also applied in the coal shipping. Where it used to cost 50c. a ton to handle ore by wheelbarrow, the Brown hoist cut the cost down to 18c. and the Hulett clamshell hoist to 5c. a ton. It is doubtful if a further reduction can be effected, though it would be possible to reduce the breakage of coal in handling still further.

The history of the movement of coal differs in each lake. The Canadian government announces that it is preparing to enlarge the Welland Canal connecting Lakes Erie and Ontario to 30 ft. in depth and to provide locks 800 ft. long and 80 ft. wide. This would greatly stimulate the trade between Lake Ontario and the upper lakes. The Erie Barge Canal will also have its influence when completed.

Bituminous at the Lower Lake Ports

Quite an amount of bituminous coal now finds its way to Lake Ontario from the port of Erie, Penn., and the eastern ports of Ohio. At the same time the Pennsylvania Railroad is ambitious to build up the port of Sodus Point on Lake Ontario and appears willing to make rail rates that are competitive with the Erie-Ontario route. Lake traffic is, however, much influenced by the offering of freight both ways for vessels and one drawback to the Lake Ontario trade is the lack of down cargoes.

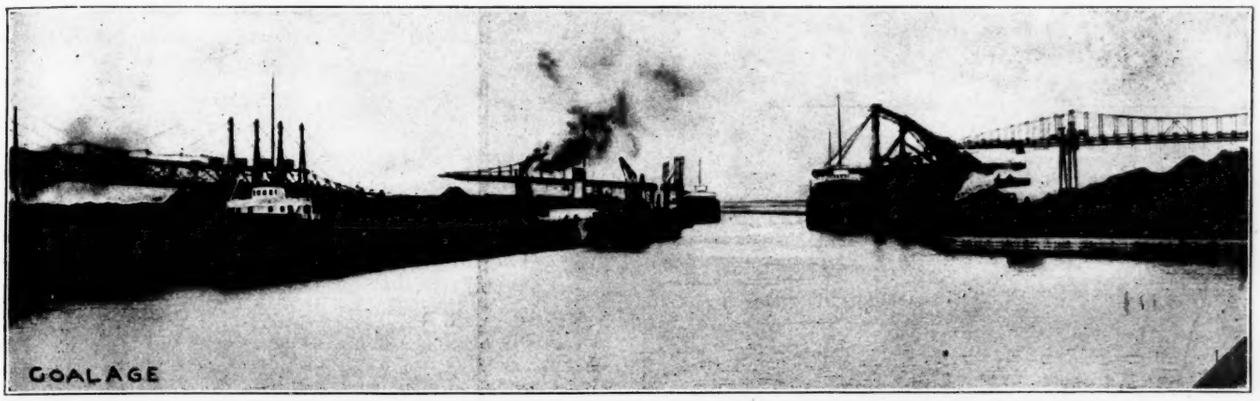
In the early history of the anthracite trade on Lake Erie there was a good demand at Sandusky, Toledo and Detroit. This trade has now been absorbed by the railroads. Buffalo ships a few thousand tons annually to Port Colborne at the head of the Welland Canal and receives varying, minor amounts from West Virginia through the port of Sandusky. Otherwise the Lake Erie coal traffic, both anthracite and bituminous, is practically all with the upper lakes. Buffalo has no other bituminous lake traffic.



Freighter "Wm. J. Olcott" Passing out of the "Soo" Locks. Capacity 12,000 Tons, Length 580 Ft., Beam 58 Ft.

Above Detroit the river ports are only a small factor in the coal trade. Some of them now receive only a cargo or two of anthracite a season, though the bituminous receipts sometimes run up to 50,000 tons. The same is true of the ports on Lake Huron. The Saginaw Bay ports once bought liberally, especially when they were heavy shippers of lumber, but partly on account of the disappearance of the lumber trade and still more since coal is produced in that section, the lake coal trade has fallen off. The port of Alpena, farthest north on Lake Huron, is increasing its traffic somewhat and since it has become the prospective Eastern terminus of a rail-

*90 Johnson Park, Buffalo, N. Y.



CONNEAUT HARBOR (OHIO), SHOWING TRAVELING-BRIDGE STORAGE TRAMWAYS IN THE BACKGROUND

road to run across to Lake Michigan its importance in the coal and other trades will soon increase materially.

The Georgian Bay ports have never been large receivers of anthracite; a cargo or two a season has been the usual amount. This coal is often considered a luxury on account of the price and many localities, even where freights are low, do not feel able to pay the difference between it and bituminous. On the other hand the need of some fuel other than wood is becoming more pressing every year. Besides this quite a number of the Georgian Bay ports are termini of railroad lines, which, though they may get most of their fuel further east on their routes, are obliged to buy quite an amount of it at the western end. Parry Sound, for instance, received 330,000 tons, Owen Sound, 100,000 tons and Midland, 80,000 tons of bituminous in 1911.

LAKE MICHIGAN

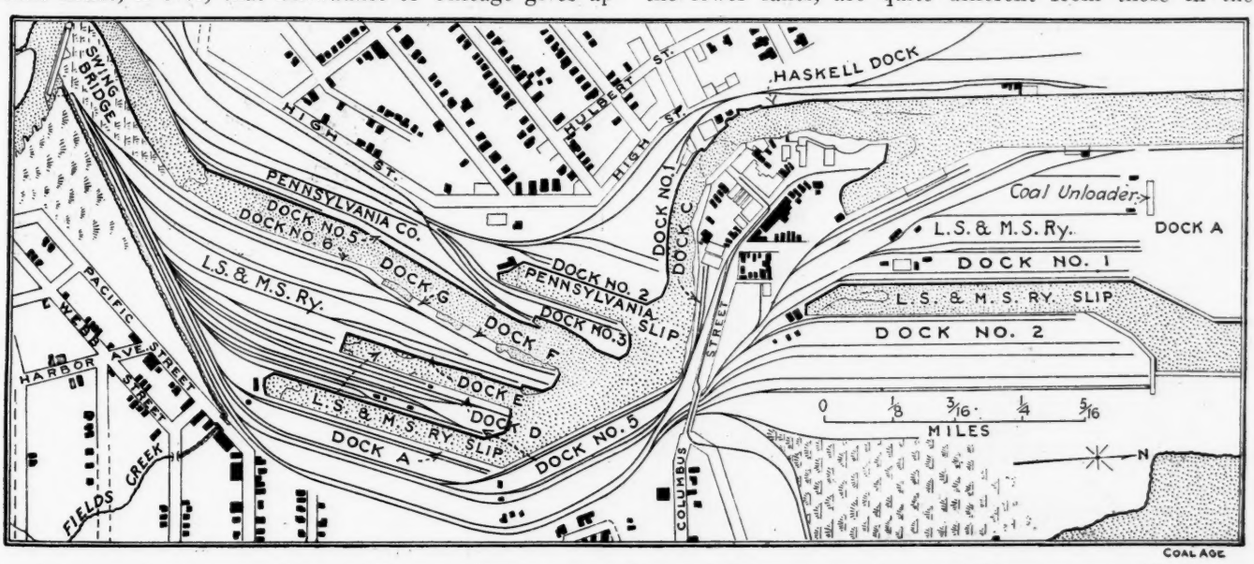
Lake Michigan ports were at one time greatly dependent on the lake fleet for coal and such is still the case with a few of the leading cities, especially if they are distributors Westward to any extent. This distributing territory is not extensive, as anthracite is not sold in much quantity either west or south of Minnesota, while the states west of the Mississippi now mine their own bituminous to a great extent. Still it will be a long time hence, if ever, that Milwaukee or Chicago gives up its coal trade by lake. The freight on anthracite by lake is a trifle, in comparison with the rail freight so that the bituminous mines of Pennsylvania, West Virginia and Ohio are able to compete with the mines of Illinois.

Lake carrying is also rapid and whether considered supplementary to the rail traffic or not it would be practically impossible to supply the territory west of Lake Michigan with coal all-rail. A lake steamer loads 10,000 tons of coal at Buffalo or Ashtabula at the rate of 1000 tons an hour and in three days is unloading it at the same rate on the farther side of Lake Michigan. For the railroads to deliver it at any such rate would be to practically shut off all other traffic on their lines.

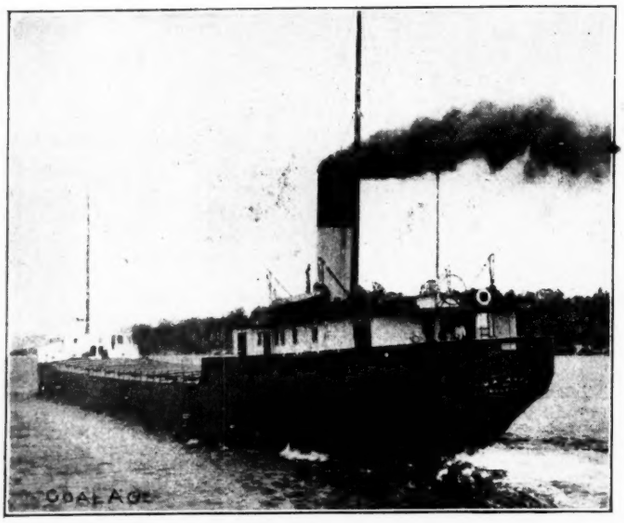
The other Lake Michigan ports receive coal in only modest quantities though the aggregate, especially of bituminous, is large. Some of them take nearly half a million tons of soft coal by lake annually, but anthracite receipts are not heavy. Sheboygan, the chief minor port, receives about 250,000 tons of anthracite and 350,000 tons of bituminous by lake, annually. Local changes of late have reduced the lake trade in anthracite at Gladstone and Manitowoc materially. The east-shore ports are mostly supplied all-rail.

LAKE SUPERIOR

Conditions on Lake Superior, as regards traffic with the lower lakes, are quite different from those in the



MAP OF ASHTABULA (OHIO) HARBOR, ONE OF THE LARGEST BITUMINOUS LOADING PORTS IN THE WORLD



FREIGHTER "MATAAFA" STEAMING UP "SOO" RIVER

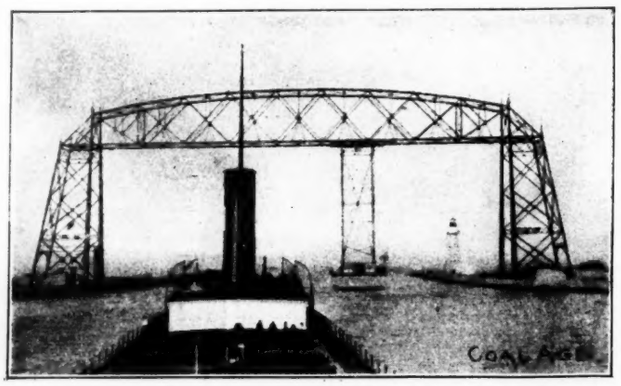
This boat was wrecked at Duluth, Minn., in November, 1906, and nine men frozen to death. She is still in commission.

other lake districts. Lake Superior trades mainly with Lake Erie and with the Canadian ports from Georgian Bay to Montreal, the latter traffic being mainly in grain and package freight. An enormous amount of iron ore, grain and flour is shipped to Lake Erie, together with quite an amount of lumber, the return freight being mostly coal. As to what this traffic is the reports of the locks at the Sault will tell. The element of rail competition is almost entirely lacking. As a rule, even from the south-shore ports of Lake Superior the rail distances to Lake Erie are fully as great as by water, while from the north-shore ports, rail shipments are entirely prohibitive.

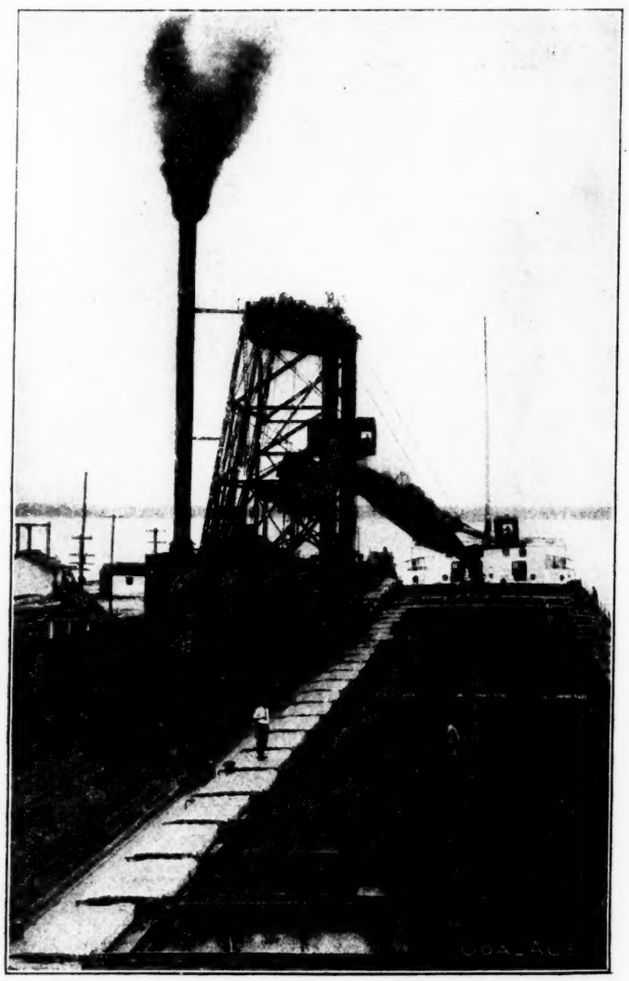
The distance from Chicago, at the head of Lake Michigan, is 540 miles by rail to Buffalo, while it is 880 by water, but the Lake Superior distances favor the water route. So it is imperative that the bulk of business eastward from Lake Superior be done by lake in the summer season. The Lake Erie ports take in all the ore and grain that will be needed till the next shipping season opens and send coal to Lake Superior on the same plan. While the coal is chiefly shipped to Superior and Duluth at the head of Lake Superior, an aggregate of 8,500,000 tons in a season, there is a large and growing trade of the same sort with other ports, particularly with Fort William and Port Arthur, the twin Canadian ports on the north shore, that feed the markets of Winnipeg and the Canadian Northwest. These two ports now receive more than 3,000,000 tons of bituminous and over 450,000 tons of anthracite by lake each season. The future of this traffic is also very bright as the adjoining country is developing rapidly.

There is also a healthy trade in coal by lake to ports on the south shore of Lake Superior, though this does not increase very fast. These south-shore ports received 70,000 tons of anthracite from Buffalo in 1912. The amount of bituminous is more than ten times that of anthracite. As to future trade there it will all depend on the prosperity of that district. The lumber business, which has been heavy for a long time, is falling off, but iron ore is still a great trade and agriculture ought to come in as the timber disappears. Outside territory to be supplied from these ports is not large as compared with those further north and west. There is a peculiar condition in the Portage Lake district, where prosperity and progress depend largely on the continuation of the copper production. The Portage Lake Canal, a short cut to the extreme upper Lake Superior and a saving of the dangerous route around Keweenaw Point, brings much tonnage to the Portage Lake district.

(To Be Continued)



AERIAL BRIDGE AT THE ENTRANCE TO DULUTH HARBOR



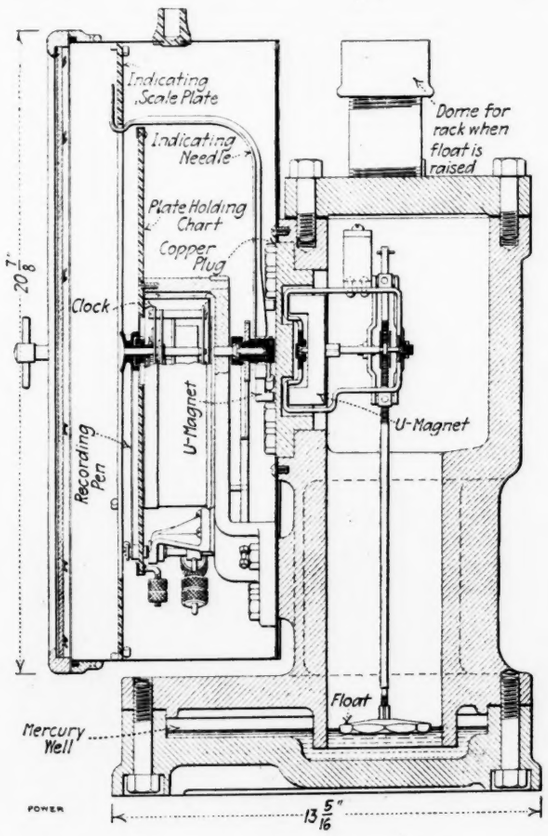
FREIGHTER "BOPE" LOADING AT THE Y. & O. COAL CO.'S DOCK AT ERIE, PENN.

POWER DEPARTMENT

An Improved Flow-Meter

In the large power plants of the present day the economical handling of steam, water, air or other fluids depends upon accurate information showing the total volume transmitted and its instantaneous rate of travel during any interval of time. Only within recent years has this subject received carefui attention, and as a result the General Electric Co. has developed a flow-meter to prevent the enormous wastes which have been allowed to take place at many plants.

The instrument evolved, as may be seen in the illustrations is designed to meet the requirement of a strong mechanical meter, which can be used not only as a test instrument, but also as a permanent means for the continuous measurement of either liquids, gases or vapors.



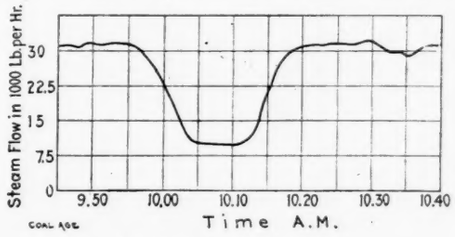
SECTION THROUGH METER

The body of this flow-meter consists of an iron casting cored out to form one leg of a U-tube, as a reservoir for mercury, the other leg of the U-tube being formed by a pipe which opens into the reservoir. The pressure on the surface of the mercury varies with the rate of flow of the fluid being measured as will be explained later.

A float rests on the surface of the column of mercury in the body of the meter, and rises and falls with the corresponding changes in its elevation. This float is geared by rack and pinion to a horizontal shaft which carries a permanent horseshoe or U-shaped magnet, whose poles face a copper cap which closes the opening into the meter body. The remaining parts of the meter's mechanism are mounted on the outside of this copper cap.

A smaller magnet of opposite polarity to that within the body of the meter is mounted upon an external shaft whose center line is coincident with that of the internal shaft if same were extended through the copper cover. The two magnets thus face each other upon opposite sides of the copper sheet, and any movement of the larger, induces through the medium of the magnetic flux an equal and similar movement of the smaller, thus transmitting motion to its shaft without the necessity of piercing the wall of the meter body. The external shaft actuated by the smaller or sympathetic magnet moves the indicating needle and the recording pen through suitable mechanism.

The pressure which moves the column of mercury in the U-tube is obtained for pipes two inches and greater in diameter by inserting a modified form of Pitot tube termed a nozzle-plug directly into the pipeline, except in cases where it is desired to increase the flow at the point of metering, under which circumstances a special pipe reducer is provided. This can be done without seriously disturbing this pipeline. The special reducer above referred to is made of brass and has a long throat with rounded entrance terminating in a flange, which is inserted in a joint of the piping and is held in place in the same manner as a gasket. A special nozzle-plug is supplied with this pipe reducer.



STEAM-FLOW CURVE

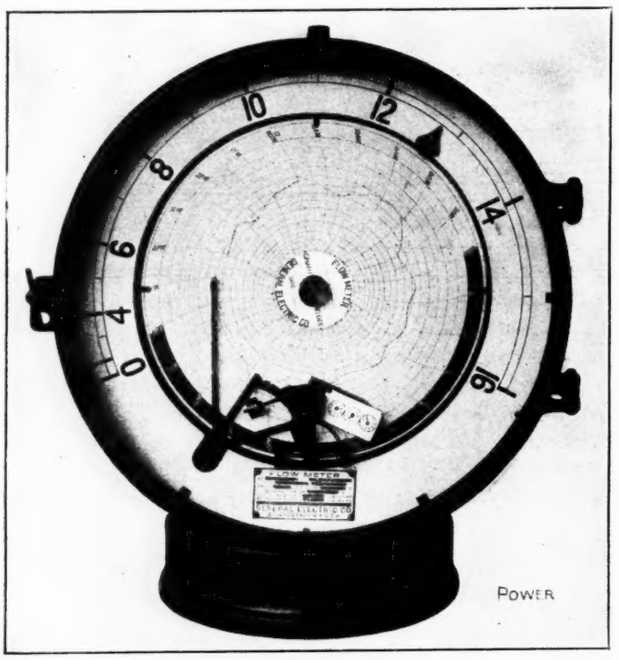
The nozzle-plug contains two separate conduits, each having a set of openings arranged on diametrically opposite sides of the plug. Those apertures upon the side which faces the flow are called leading, while those on the opposite side are called trailing openings.

The flow against the leading openings in the nozzle-plug sets up a pressure in the leading conduit which equals the static pressure plus that due to the velocity head. The flow past the trailing openings causes a suction which lowers the pressure in the trailing conduit to a point which is below the pressure existing in the pipe line. As these two conduits are connected to opposite legs of the U-tube by ¼-in. pipe, the column of mercury is affected by this unbalanced pressure, causing a corresponding movement of the float.

The openings in the nozzle-plug extend across the pipe diametrically so as to make the pressure transmitted to the meter as nearly as possible that due to the mean velocity rather than that at a single point in the pipe.

The chart upon which the pen records are made is rotated by a suitable clock mechanism. The recording pen sweeps the chart radially and the resulting curve shows the rate of flow at any time during the chart cycle.

An integrating device sometimes applied to this meter consists of a stationary flow-rate planimeter driven by the chart paper. The angular position of the planimeter wheel is determined by a cam connected to the shaft of



METER WITH INDICATING SCALE, RECORDING CHART AND INTEGRATING DIAL

the recording pen and moving with it. The planimeter dials read in arbitrary quantities, which multiplied by a constant furnished with the meter gives the flow in the desired unit. This device is extremely simple and there is practically no danger of its getting out of adjustment.

For pipes which are less than two inches in diameter, an orifice-tube made of brass and tapered internally from both ends so as to form a restricted opening at the middle of the tube is provided. This must be incorporated in the pipe line. One leg of the U-tube is connected with the orifice-tube near its end and the other leg to its middle point where the greater velocity will give a reduced pressure in the pipe leading to the recording instrument.

To meet the requirements of the different classes of service, and the various conditions met with, the meter can be made up in four different ways: First, as a recording or curve-drawing instrument; second, with both indicating scale and recording chart; third, with recording chart and integrating dials; fourth, with indicating scale, recording chart and integrating dials.

Some of the large manufacturers of power have found that flow-meters pay for themselves in a short time. By their use the record of the performance of the apparatus shows whether or not it is operating at its maximum efficiency. Surprising conditions have been brought to light by their use showing at the same time their great practicability.

A flow-meter upon each boiler of a battery operating upon a single header shows exactly what each is doing, and permits adjusting the operation of the units so that each will carry its full share of the load. They also indicate immediately whether the load has increased, or the steaming rate of the boiler's decreased in case the steam pressure begins to drop. Moreover, it is possible from the graphic record to determine whether the method of firing can, or cannot be made more efficient.

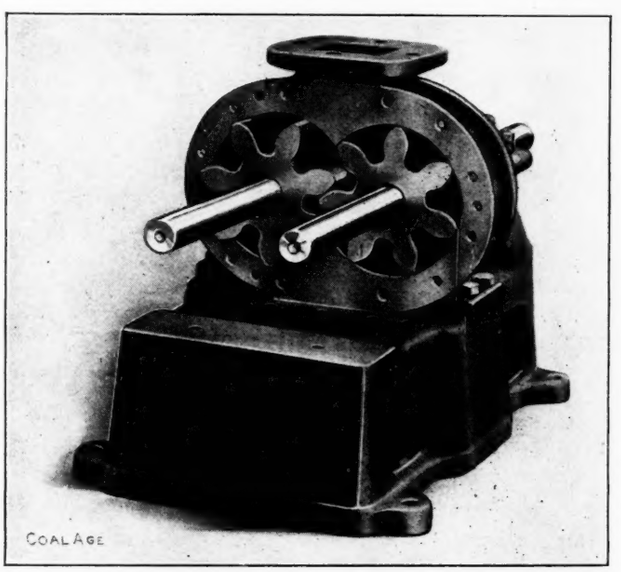
In a big plant the use of flow-meters makes it possible to segregate the cost of the steam, water, etc., so that each department may be correctly charged with its legitimate share of these expenses. A study of the feed-water chart will determine the rate at which the feed water should be supplied in order to secure the highest degree of efficiency.

These illustrations of the application of the flow-meter give some idea of the adaptability of the instrument, and the type of service for which it is fitted.

A New Rotary Pump

The Goulds Mfg. Co., of Seneca Falls, N. Y., have recently placed upon the market a new rotary pump of a unique design. Heretofore machines of this type have usually been made with two- to three-lobed cams. These are rotated in their proper relation to each other by external gears placed upon the camshafts.

In the new design, as may be seen from the accompany-



THE NEW PUMP WITH END OF CASING REMOVED

ing illustration, the cams are practically pinions meshing together. They therefore require no external gears to revolve them in their proper inter-relations.

These machines are simple in construction, valveless, and may be either belted or direct connected to any suitable means of driving. They are built to withstand a working pressure of 100 lb. or a head equal to about 230 ft. of water. Water cutting of the cams caused by the rapid expulsion of the liquid entrapped between the teeth of the two gears has been eliminated by means of a bypass opening in the end cover of the machine.

EDITORIALS

The Brookside Explosion

The explosion at the East Brookside colliery, which occurred at 11:30, Aug. 2, proves not to have originated from dynamite. The exploration of the workings revealed that the 175 lb. of dynamite and 75 lb. of carbide stored in the mine had neither of them contributed to the explosion. It was naturally assumed that dynamite was the cause, as the explosion killed immediately all the men where the dynamite was stored and was not so death-dealing in other parts of the mine, but the finding of the explosive intact disproves that assumption. It is said that the bodies of the men were badly burned yet their clothing was not scorched and even loose pieces of paper were not consumed. The punk-like fringe on the timber also was not ignited.

These strange phenomena have given rise to the idea that there were no explosions, properly so termed, and that the men were killed not by flame but by a blast of heated air. At Valleyfield in Scotland, where an outburst of coal occurred, smothering the men, they were found when uncovered to be blistered, apparently by the heat of the escaping gas. A heavy fall of rock might also serve to heat the air in like degree, and in this case the air current was sufficient to sweep the clothes from the bodies of the men. Perhaps the explosion will serve to open in a definite way the problem whether the heat of compression in a mine is ever so severe as to start an explosion of coal dust and air. James Asworth has claimed for several years that it is.

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The Original Sulphur in Coal

For the discussion which follows we define "original" or "intrinsic" sulphur in the coal as the sulphur which was an integral part of the vegetal substances composing the peat bog from which the coal bed is derived. Of course, it is obvious that these terms are only relative, for the sulphur did not *originate* in the peat bog but was in the first place a part of the molten magma. Later, after chemical change, it was dissolved by thermal and surface waters and deposited by them in the depths of lagoons or in the ocean, and finally was drawn into the plant system with the vegetal juices.

We were surprised recently when a mining engineer of ability and no little information declared that "organic" sulphur was the sulphur irreducible by heat and was in the form of calcium sulphate. All other sulphur bodies were in his view additive compounds to the original deposit and probably he conceived that no other sulphur-bearing bodies were present in coal except iron pyrite.

As the word organic is usually restricted to compounds containing carbon and hydrogen, perhaps he should have said "original" sulphur, but in any event it may be pointed out that he took a narrow view of the possibilities of the occurrence of sulphur in coal from vegetal sources.

Nor are most commercial chemists disposed to view the matter in a much larger light, for some appear to believe that the sulphur of the original coal substance is always in the form of a sulphate and few would be disposed to regard pyrite as being merely a much altered outcome of the original vegetal juices. In view of the erroneous speculations now passing muster, perhaps a few suggestions might unsettle errors, even if they did not establish fact.

As we find in the ash of coal the elements, iron, aluminum, calcium, sodium, potassium, magnesium and sulphur, it is not unreasonable to expect that coal may contain or have contained ferric or ferrous sulphates, potash and soda alums, gypsum and magnesium sulphate. All these are more or less soluble in water and may enter with the fluids as plant foods. Barium sulphate is so freely absorbed by some plants in the arid West that the "locoing" of horses is ascribed to the consumption of a weed thus rendered poisonous.

That sulphur enters into the plant organism mainly as sulphates may be conceded readily. Though sulphurous acid has been shown to be inspired by oak leaves in the neighborhood of works producing that gas, probably no measurable sulphur in coal arises from any such source, though some sulphur may have entered the plant economy as a hydrocarbon compound with the vegetal juices yet not as a sulphate.

But we need not necessarily assume that the sulphates entering the vegetal substances are unchanged chemically, nor is it reasonable to infer that, after the vegetal matter has died and been wholly or partially metamorphosed, further changes are impossible. It is true that most of the sulphates are little affected by heat, but they are not so stable when attacked by other methods and under different conditions.

There are plenty of indications that the sulphur is not entirely retained as a sulphate. Otherwise how could we explain the fact that when vegetal matter is heated to the boiling point, the sulphur content is reduced; and how could we find a cause for the evaporation of 0.65 per cent. of sulphur when a certain cannel coal was heated to 212 deg. Fahrenheit?

It has been noted that coals which have been subjected to great heat show less sulphur than those which have been less heated; the anthracites and semibituminous coals of the Appalachian disturbance contain less sulphur than the fuels more remote from that trouble. If the coals had been rich in certain sulphates, the heat could not have reduced their sulphur content without some chemical reaction.

If the sulphur had been pyritic, some might possibly have been reduced almost to the monosulphide form. If this had occurred it is strange that the iron in coal would not be found today in combination with one atom of sulphur, for the monosulphide does not have the power of reabsorbing the atom which it has lost. This leads us to wonder whether the heat which metamorphosed the coal was sufficient to separate sulphur from pyrite

and whether at the time of maximum heat any pyrite existed.

These considerations tend to make us believe that at the time when the Appalachian uplift was thrusting most severely, pyrite was largely absent and the sulphur was in combination with carbon and hydrogen and indeed, as we find that the upper coal measures often thicken in the Appalachian folds, we are disposed to think that the uplift must have been started even before these measures were laid down and that the coal was a mere peat, when the pressures were severe.

But we must not be too willing to declare that the sulphates were absent when the uplift occurred, for these bodies are not so permanent in character as is often thought, and conditions favoring their reduction were probably in existence and these actions, made more effective by the heat of uplift, may have been hastened by that action.

According to Hoppe-Seyler, nascent methane has a marked power of acting upon sulphate of lime. He produced such an action by the use of fermenting cellulose. Furthermore, according to Ochsenius, a solution of magnesium sulphate in which hay or straw is kept is turned to a sulphide.

Other changes are, however, possible. Thus it has been urged that in the presence of carbon, the sulphate of calcium will be converted to a sulphide, the oxygen joining with carbon to form carbon dioxide. The sulphur of this sulphide might then combine with the hydrogen of the water and the dioxide mentioned unite with the calcium and the oxygen atom of the water to form hydric sulphide and limestone respectively.

Nor are these all the possibilities, because we know there are bacteria which have a power of extracting sulphur from sulphates. Such are the Beggiatoa alba and Chromatium Okeini. Beijerinck has shown that in the absence of air, sulphates may be reduced at a temperature of 77 to 86 deg. F. in 12 to 14 hr. by these low forms of life. In the absence of air, there would be no oxidizing bacteria to complete the sulphur circle and to form sulphates anew as usually happens today.

The formation of hydrogen sulphide from sulphates, probably by bacterial action, is constantly going on in the Black Sea, and as samples are taken below the surface this enrichment is found to increase continually and in a marked degree.

The main difficulty in the acceptance of a bacterial action as an explanation arises from the fact that sulphur bacteria appear to have been most active in more recent times and the most marked effect of their work is found in the Miocene period, and not as early as the Carboniferous.

Certain it is that the bulk of the sulphur now being mined is stratified in such manner that we cannot believe it was placed where it is by volcanic action. It is probably derived from some body, vital or chemical, which has leached the sulphur from its original place as part of some sulphate, possibly gypsum. As this process has been so general there is no obvious unreasonableness in the assumption that all the sulphur in coal, whether as sulphate, sulphide or hydrocarbon compound, was originally absorbed as sulphate in the plant food.

That pyrite is an impurity derived from the plant tissue is suggested by the fact that it is not found in the clay floor. In fact, the sulphates are not often found in clay nor are the sulphides. But pyrite is probably rarely found in precisely the same position as the sulphate from which it is formed, and its quantity may have been increased by inflows of ferrous and ferric or other sulphates which were converted to pyrite by the action of methane.

The Bituminous Market in New England

The soft-coal market this year has been an enigma, particularly in New England. When the operators put the 15c. advance on Pocahontas, New River and Georges Creek, coincident with the depression in business circles early in the spring, it seemed like tempting fate, and predictions were made freely that so much coal would be offered that the selling price would be down to the same basis as 1911 and 1912 by the current month.

Obviously these forecasts were wrong. Even with heavier receipts at Boston than ever before, the new high level has been firmly maintained and it is doubtful if a single ton has sold at a concession. The labor trouble in the New River field, and the possibility of an extension into other parts of the state, was no doubt a factor in the situation; but it was not a controlling one as prices continue as firm, the demand as insistent, and the loading at Hampton Roads as slow, even now that the strike has been definitely settled.

There are a number of conditions that point to a deficiency in the local supplies. Water shipments to Boston for the first six months of the current year are some 200,000 tons ahead of those for the same period last year; but the vessel movement last year was abnormally light, the difference being made up by a larger rail tonnage from Pennsylvania and furthermore the average annual increase in the water arrivals during the past few years has run between two and four hundred thousand tons. In addition to this there is the acknowledged fact that a number of the typical contracts are seriously in arrears.

In New England it is felt that the situation hinges entirely on the production and the outlook is regarded as not particularly favorable because of the reports of a poor labor supply. Should the production be seriously crippled by the insufficiency of miners and conditions further aggravated by the anticipated car shortage, there will undoubtedly be a tense situation this winter. Such a contingency will naturally broaden the market for the Pennsylvania grades, there already being a noticeable increase in the shipments out of Philadelphia.

The past history of the trade shows that when the summer market turns the corner in August or earlier and begins to improve, there is small probability of any easing off until the winter is over and the spring cessation appears. Another condition that is already being anticipated in some quarters, is the possibility of another suspension in the bituminous fields next April; should the outlook prove serious, a heavy storing movement on the part of the consumers might be started that would precipitate a runaway market. Even with a large production the winter trade promises to continue firm, although fairly steady, but with any restriction on the output due to a shortage of cars or labor, the situation will be serious.

SOCIOLOGICAL DEPARTMENT

The Woodward-Pettebone First-Aid Meet

SPECIAL CORRESPONDENCE

First-aid teams from seven of the largest collieries of the anthracite field were pitted against each other in contests, held at Harvey's Lake, and 5000 spectators viewed the events. The contests were held under the auspices of the Woodward and Pettebone teams, of the Delaware, Lackawanna & Western R.R. Coal Department, and prizes were awarded in each of the contests.

The problems presented were not of a difficult nature, but they were such as caused the men to use their wits, though none could be rightly regarded as catch problems. They were such as any first-aid team is apt to be called upon daily to solve in anthracite mines. All the teams showed the benefits of careful training, and while all of them could not be prize winners, each and every team performed its work in a highly creditable manner, and no first-aid team was forced to go home ashamed of its demonstration.

The Pyne colliery team, of Scranton, won the prize for the big event, which was $20. A safety lamp was awarded to the captain. The Pyne team scored 96½ points. The Avondale colliery team was second with 93 points and won $12 as a prize and a safety lamp for the captain. The third prize, $5, was won by the Auchincloss team.

THE THREE JUDGING PHYSICIANS, HENRY G. DAVIES AND CHARLES ENZIAN

SUBJECT TREATED FOR COMPOUND FRACTURE OF NOSE AND DISLOCATION OF LEFT SHOULDER

SYLVESTER METHOD OF ARTIFICIAL RESPIRATION

RESCUING MAN WHO TOUCHED LIVE WIRE

TREATING SCALP WOUND, THE CAPTAINS' EVENT

The results of the contest follow:

Full-Team Event—Problem No. 1—Compound fracture of jaw, left side, blood spurting; compound fracture of right collarbone and a lacerated wound of left elbow.

Problem No. 2—Burns of head, face, chest and arms, and an incised wound of heel of left foot.

Pyne colliery	96 1-2	Bliss colliery	90 1-2
Avondale colliery	93	Truesdale colliery	90 1-2
Auchincloss colliery	91 1-2	Bellevue colliery	90 1-2
Raub colliery	91 1-2	Forty Fort colliery	87

Captains' Event—Problem—Large scalp wound (Capeline roller bandage). Lacerated wound of left shoulder (spica).

William Hill, Bliss colliery	100	H. R. Kettle, Avondale colliery	90
William L. James, Truesdale colliery	95	Philip Williams, Forty Fort colliery	90
J. M. Jones, Bellevue colliery	93	William Griffiths, Pyne colliery	88
James H. Jenkins, Auchincloss colliery	91	Nicholas Cook, Raub colliery	88

Two-Man Event—Problem—Compound fracture of nose, dislocation of left shoulder.

Auchincloss team—James Jenkins and John H. Keating, 100. Time, 3:47.

Raub—Nicholas Cook and William Rowett, 100. Time, 7:45.

Forty Fort—Philip Williams and Walter Jones, 100. Time, 11:45.

Truesdale—D. J. Williams and W. L. James, 100. Time, 11:45.

Biss—William Jones and William Hill, 95.

Bellevue—Thomas Robson and Edmond Davis, 95.

Avondale—W. R. Williams and John Driscoll, 90.

Pyne—Albert Rose and Philip Watkins, 88.

One-Man Event—Problem—Rescue man who has taken hold of live wire; carry 50 ft., perform artificial respiration and dress for burns.

Pyne—Albert Reese, 100	Auchincloss—J. H. Keating, 93.
Bellevue—William Williams, 95; Time 8:54	Bliss—W. J. Hill, 92.
Forty Fort—William Cutts, 95; Time 11:25	Raub—Martin Inman, 90.
Truesdale—John Traber, 95; Time 13:2	Avondale—Ezra Griffith, 90.

THE OFFICIALS AND JUDGES AT THE WOODWARD-PETTEBONE MEET

One-Man Event—Problem—Wound in palm, severe bleeding, also wound of right eye.

Truesdale—E. J. Williams	100	Forty Fort—John Kasperin	92
Bliss—John Grosil	97	Avondale—Frank Maday	90
Raub—William Roderick	95	Pyne—Thomas Llewellyn	87
Auchincloss—William Bailey	95		

The following members comprised the different teams:

Bliss—W. J. Hill, William Jones, Isaac Edwards, Oliver Parfet, Thomas Thomas, John Grosil.

Truesdale—W. L. James, Arnold Menge, Joseph Stinson, D. I. Williams, John Traber, E. J. Williams.

Bellevue—J. M. Jones, Edmond Davis, William Williams, Martin Ratchford, Thomas Robson, John Mulhern.

Auchincloss—J. H. Jenkins, J. H. Keating, Thomas Wren, Thomas Chamberlain, Ire Angle, William Bailey.

Avondale—H. R. Kettle, John Driscoll, W. R. Williams, Ezra Griffith, Daniel Thomas, Frank Haday.

Pyne—William Griffith, Albert Rose, Philip Watkins, Jenkin Davis, Thomas Davis, Thomas Llewellyn.

Forty Fort—Philip Williams, Frank Romanshusky, Walter Jones, Andrew Tebust, William Cutts, John Kasperin.

Raub—Nicholas Cook, William Rowett, Martin Inman, John McGroarty, Leo Smith, William Roderick.

The prizes were awarded by Henry G. Davis, superintendent of the Wyoming Division of the Delaware, Lackawanna & Western R.R. Co., Coal Department. Charles Enzian, of the Federal Bureau of Mines, was master of events. The judges were: Drs. J. A. Samuel, Charles L. Shafer and A. B. Smith.

The H. C. Frick Coke Co.'s Picture Show

The stereoptican show which has been prepared by the H. C. Frick Coke Co. of Pennsylvania, a subsidiary of the United States Steel Corporation, was recently shown at Vivian, W. Va., to twelve or fifteen hundred interested spectators. After the show had been given at the mines in and around Gary, it was turned over to Lawson Blenkinsopp, state mine inspector of the 11th district, for use at other points in his district.

The idea was conceived by Thomas Lynch, president of the United States Coal & Coke Co., and of all the other subsidiary coal companies of the United States Steel Corporation but one. The coal mines under his jurisdiction together produce more than half as much coal as the great state of West Virginia, and notwithstanding the fact that this coal is mined largely from shaft and slope mines, some of which are deep and gaseous, the number of men killed per million tons of coal mined is much below that of the state of West Virginia, the United States, or any other mining section. After Mr. Lynch had decided what scope he wished to cover with these pictures, he turned the matter over to W. H. Clingerman, general superintendent, J. P. K. Miller, chief engineer, and Austin King, chief mine inspector, all of the H. C. Frick Coke Co., for development. Mr. King was given full charge of the work and spent the better part of a year in taking thousands of pictures of various accidents as they happened, sham accidents, and conditions where accidents had occurred previous to the time he began this work.

After the pictures to be shown were selected, they were exhibited at all the mines, some 60 in number, of the H. C. Frick Coke Co., located in Westmoreland and Fayette Counties, Penn., including the towns of Connellsville, Scottdale, Mt. Pleasant and Uniontown. They were also shown at the mines of the National Mining Co. in Allegheny County, Penn., in Pittsburgh for the benefit of the Coal Mining Institute of America; at the mines of the United States Coal & Coke Co., and at Vivian and Welch, W. Va. They are to be taken to Indiana and Illinois to be exhibited at the mines of the Steel Corporation in those states, after which they will be rearranged with some moving pictures that are now being made in the mines of the United States Coal & Coke Co. with the assistance of that corporation. Photographers from the Government Bureau of Mines are doing this work.

A number of views are also shown of special features of the United States Steel Corporation work, including trained nurses taking care of the sick; the first-aid team which won first prize at the International Red Cross Convention at Washington; swimming pools and play grounds for the children, etc.

A reel of comic moving pictures entitled, "That College Life," and a film showing the results of disregarding safety devices are also exhibited. A number of panoramic views were shown at Vivian, W. Va., of the various plants of the United States Coal & Coke Co. at Gary, as well as a reel of moving pictures of the parade, first-aid contests and various athletic exercises on the Fourth of July.

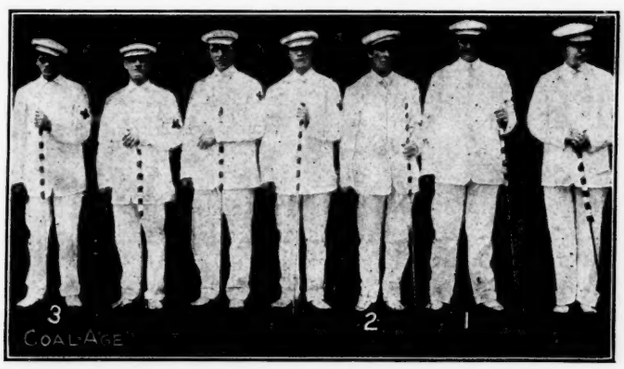
The First-Aid Prizes, 1912

The William Howard Taft Fund was established by an anonymous friend of the Red Cross and its intention is to provide prizes for first-aid work on railroads. The awards are $50 for the first prize, $25 for the second, $15 for the third and $10 for the fourth.

The Red Cross Society has itself offered similar prizes

for meritorious first-aid work in all industries but railroading, limited to students of classes organized under Red Cross auspices. As recorded in our news department recently, three men in the Cary team of the Continental Coal Corporation were recipients each of one-third of the first prize. Through the favor of W. L. Moss, the general manager, we are able to show a picture of the team, with the first-aid prize winners carefully indicated.

From the affidavit of Fred D. Haston, M. D., of Arjay, Ky., we obtained the following details: Thad Idol, an employee of the Continental Coal Corporation, at Cary, Ky., was injured in the mines at that place on Oct. 29, 1912, about 3 p.m. by a small mine car leaving the track and running over his left leg about three inches above the ankle, producing a fracture of the fibula with considerable contusion of the skin and neighboring structures. The pain was intense, so much so that the patient remarked that the few moments while the first-aid men were reaching him seemed like as many hours. Prob-



THE CARY FIRST-AID TEAM OF THE CONTINENTAL COAL CORPORATION

(1) W. T. Caton, (2) Ed. Duncan, (3) Lester Lock. These three each received one-third of the prize paid by the American National Red Cross for the best example of first-aid work actually done during the year 1912.

ably a space of 10 min. elapsed between the time of the injury and the application of the first-aid dressing, which was performed by W. T. Caton, Luster Lock and Ed. Duncan, all of the Cary team, and holders of first-aid diplomas from the Continental Coal Corporation as a result of the contest of Aug. 24, 1912. They also had received certificates from the American Red Cross Society.

Instant relief was given the victim by the proficient and prompt work of the first-aid men. Thad Idol testified that he felt no more pain after his leg was dressed. Two hours later, the injury was inspected at the miners' hospital, to which the victim was removed and Drs. Haston and B. E. Gianini, the latter of Straight Creek, declared it to be the most nearly perfect first-aid dressing ever applied in that mining district.

The second prize was won by Edmund Williams, of the Berwind-White Coal Mining Co. He treated a severe case of Pott's fracture, which is a breakage of the lower part of the fibula, accompanied with injury to the ankle joint, so that the foot is dislocated outward. The accident occurred at Eureka No. 39, on Feb. 26, 1912. Dr. J. W. Hawes, of the B.-W. C. M. Co., was attending surgeon.

The two other prizes went to men who were not employed at coal mines.

G. B. Markle Co.'s First-Aid Contest

Special Correspondence

The first annual first-aid contest of the C. B. Markle Co. was held at Drifton, on Aug. 8. The corps participating were Highland No. 2, Inside, Jeddo No. 7, Inside, Jeddo No. 4, Inside, and Highland No. 5, Outside. The contest consisted of four events, as follows:

Event No. 1. A man falls, fractures his nose and receives a bad laceration on the right side of the head, 2 in. above the temple.

Event No. 2. Fracture of the middle of the left forearm.

Event No. 3. A man is rescued from a gas explosion and turned over to the first-aid team to be treated for a badly burned head, neck and shoulders.

Event No. 4. A man receives a compound fracture of the left leg, 4 in. above the knee; the artery is cut also. Patient to be transported on stretcher after being treated.

The ratings in detail were as follows:

Event No.	Jeddo No. 4 Inside	Highland No. 5 Outside	Jeddo No. 7 Inside	Highland No. 2 Inside
1	98	98	96	98
2	98	89	93	95
3	95	100	98	93
4	98	100	98	98
Average,	97¼	96¾	96¼	96

Each corps was started with a credit of 100 per cent. and penalized in accord with the recommendation of the National Mine Safety Association; in fact the whole contest was conducted as nearly as possible along the lines suggested by that body.

The general rules governing the contest were as follows: 1. All teams will contest each event simultaneously, and the captain of each team will announce to the judges the moment his men have finished the work on the patient. No work will be allowed after such announcement. 2. There will be no penalty for slowness in work unless same is sufficient to cause further injury to the patient. 3. No coaching or aid from anyone not in competition is allowed. 4. The following penalties will be imposed:

	Per Cent.
For not doing most important thing first	2
For captain's failure to command men properly	2
For slowness in work	2
For failure to cover wound completely	2
For wrong artificial respiration	2
For loose splint	2
For not padding splints properly	2
For loose bandage	2
For bandage too tight	2
For "granny knot"	2
For awkward handling of patient on stretcher	2
For lack of neatness	2
For assistance lent by patient	3
For tourniquet too tight	3
For failure to stop bleeding	5
For not treating shock	5
For failure to be aseptic	10

The members of the competing corps were as follows:

Jeddo No. 4 Inside:
Henry Klose (captain)
Andrew Kushner,
Hugh McMonigal,
Edward McMonigal,
Joe Lynott,
Josepn Makuta (patient)

Highland No. 5 Outside:
Donald Beverage (captain)
Mike Leback,
Mike Klupz,
Charles Dennion,
Mannus McLaughlin,
Con. Gaffney,
John Soltas (patient)

Jeddo No. 7 Inside:
James Gildea (captain)
James Mulhall,
James O'Donnell,
Ben Bittner,
John Spitzner,
Thomas Thomas (patient)

Highland No. 2 Inside:
Daniel Bradley (captain)
Patrick Quinn,
Geo. Zeisloft,
John Contina,
John Gallagher,
Walter Cherekowskie (patient)

The judges were: Dr. T. H. Mays, of Drifton; Charles Enzian, of the U. S. Bureau of Mines, and Atherton Bowen, of the Lehigh Valley Coal Co.

Previous to the contest A. B. Jessup, general manager of the G. B. Markle Co. gave a short address, concluding with an introduction of the judges. Mr. Enzian then gave a talk in which he gave an outline of what was expected of a first-aid man and a first-aid corps. Following the contest Dr. Mays talked on the surgical questions raised by the problems in the contest, and Mr. Bowen commented on the team work and discipline.

G. B. Markle concluded the program by awarding the prize, a handsome loving cup, to the Jeddo No. 4 Inside Corps. In his remarks he congratulated all the teams and expressed much gratification on account of the excellent work in the contest and said that, although among the last to take up this work in a systematic way, ample facilities would be furnished and he confidently expected that such a state of efficiency would be reached that their position as compared with the other corps in the coal fields would be among the first.

DISCUSSION BY READERS

Mixed Lights in Mining

Letter No. 11—This subject has not been discussed as thoroughly as I had hoped. Each week I have waited anxiously for some new arguments that would alter my opinion. But thus far, I have failed to see any reason advanced that would warrant the use of mixed lights in a mine generating gas. In my opinion, if gas has been discovered in any portion of a mine, there is no certainty that the danger can be confined to that one district and in this case, safety lamps should be employed throughout the mine.

No one will deny, of course, that there is a certain disadvantage in working with a safety lamp, but the annoyance is more imaginary than real and should not be considered when the question of safety is at stake. It seems to me the time has come when we should consider how far we can keep away from danger—not how near we can ride to the edge of a precipice without falling over.

The recent Cincinnati mine explosion, Apr. 23, has taught us a lesson in reference to the use of mixed lights in a mine operating in a gaseous field. This mine was examined by the mine inspector six weeks previous to the explosion and reported to be free from gas. By the explosion, 96 lives were sacrificed. As stated in COAL AGE, May 3, p. 679, the use of mixed lights in the Cincinnati mine and other mines in the Pittsburgh district is naturally revived by this disaster, which emphasizes the danger of the use of open lights in any part of a mine where safeties are required in certain districts or places. Numerous other disasters could be mentioned that prove the same rule.

In some cases, recently, electric lamps have been tried and used in place of safety lamps. While these lights can be used on the intake airway where it is unnecessary to test for gas, in my opinion, they cannot be employed generally in the regular work at the face, because they give no indication of the presence of gas.

The argument has been advanced against the use of the safety lamp; namely, that it affects the eyesight. This may be true in some cases but is not my experience. During the 30 years I have worked in the mines, I have used the safety lamp a good portion of the time; and I can still read the finest print without glasses.

Another argument that has been advanced is that a man cannot do as much work with a safety lamp as with an open light. While I have no statistics to prove that this statement is not true, my experience is that the safety lamp gives enough light for digging coal and performing any other work required in the mine. The point that appeals to me is that if coal can be mined to pay, in one district, with a safety lamp, it can be done all through the mine.

The cry "Safety first," it seems to me, is wholly inconsistent with advocating the use of mixed lights in mining. The inconsistency is more apparent than ever when it is considered that thousands of dollars are spent each year to ascertain and test the safest methods to be employed in mining coal. Thousands more are spent for inspectors to examine and see that the safety devices in use are efficient and in good condition. At the same time, we find many operators, for the sake of saving another dollar, endeavor to see how little they can do and still comply with the law. They do not consider that in saving one dollar they may lose a thousand.

THOMAS HOGARTH.

Heilwood, Penn.

Letter No. 12—I do not consider that the use of mixed lights is dangerous, in coal mining, provided proper care is exercised to safeguard the practice in the mines, and provided the workings are well ventilated. With proper mine regulations strictly enforced, no accident should occur.

The miners at the working face require a good light, which the safety lamp does not afford. For this reason, the use of the safety lamp, at the coal face, should be avoided wherever this is possible. Provide a good air current well conducted to the face and use open lights wherever and whenever this is practicable, is my theory.

In my opinion, a mine operated entirely under locked safety lamps has as many chances of an explosion as one where mixed lights are permitted. They are both generating explosive gas and the same care and vigilance that make one mine safe will make the other safe also. What is needed is a good system of ventilation whereby an ample air current is circulated throughout the entire mine and so conducted that it will sweep the working face in every room or chamber. By this means the gases generated will be rendered harmless, and it will be impossible for any gas to accumulate in dangerous quantity.

It is important also to examine every part of the mine daily and often, where gas is generated. Whenever a shot is fired, the place should be examined for gas before the workmen are allowed to return to their work. In order to prevent the short-circuiting of the air by a door being left open, a check door should be provided wherever this is necessary, and an attendant should be on hand constantly when men and cars are passing.

R. J. PICKETT.

Shelburn, Ind.

The Mine Air after an Explosion

In reading different articles relating to mine explosions, I have often been surprised at the statements of some of our best mining men that seem to indicate a doubt or misbelief, on their part, that any firedamp could remain or be present after a mine explosion.

On several occasions, I have made tests of the mine air following an explosion of gas; and, in many cases, have been able to detect the presence of firedamp in considerable quantity. An instance of this kind occurred some months ago in a thoroughly equipped and well ventilated

mine, near Pittsburgh, where an explosion of gas occurred by which two miners and a fireboss were badly burned. One hour after the accident, I accompanied the mine inspector of the district and the officials of the company to the scene of the explosion to ascertain, if possible, its cause and effect.

The miners had been pulling entry stumps. They were using the Wolf safety lamp. While changing cars they had neglected to close the door on the entry, thereby short-circuiting the air at that point, which caused the gas accumulated above the falls to descend to where the men were working. Just at that time, the fireboss, making his rounds, closed the door and proceeded at once to where the men were working. Taking one of their lamps, he started to show them the gas that he knew *was* present, when the lamp exploded with the results mentioned.

Although we were there and made the test for gas only an hour after the explosion occurred, we were able to find a sufficient body of firedamp to produce again the same results. This firedamp had accumulated after the explosion, which showed that the previous inflammation had not been sufficient to consume all the gas. There was, in this case, a considerable amount of unburned gas, which only required an addition of fresh air to produce a second explosion if ignited. In any case, such ignition might occur from a fire trail started by the first explosion.

JOHN E. AMBROSE.

New Durham, N. J.

The Liquor Problem in Mining

I was interested in reading the letter of "Mine Superintendent," on this subject, COAL AGE, Aug. 9, p. 186. Many have experienced the same difficulty that he has described, in eliciting assistance from those in authority. As far as the law is concerned, it is apparently a case of "work out your own salvation." At the request of the writer, on one occasion, the district attorney employed two detectives for the surveillance of a place in the effort to suppress the drink traffic. The result was the inebriation of these minions of the law.

A few years ago, the writer having been appointed to take charge of a large and important operation, paid a visit to the place, unknown to any one. Although it was the Sabbath, drunken miners, in every state of inebriation, were to be seen lounging about and sleeping or singing ribald songs in their own language. On many porches, kegs were on tap while glasses were clanked in drinking health. The scene was disgraceful and, to avoid insult, the sober, intelligent few kept themselves indoors.

The outlook was discouraging and I determined, then and there, to hit the cause hard, from the start. My information, on assuming charge, was that the mines were never worked to full capacity until the Thursday following each pay day. Monday was known as "blue Monday" and Tuesday was little better, with a slight improvement Wednesday; but Thursday the conditions were again normal. The general superintendent gave me his unqualified support and a fighting campaign was determined. The mine foremen were ordered to make out lists of those addicted to the drink habit. The clerks furnished a list of boarding-house keepers, giving the number of boarders and their names and nationality.

The next move was to notify the drivers of all beer wagons to remove the empty kegs from the streets at once. This order was ignored and the company, after waiting patiently a few days, sent the company wagons to collect every keg found in the street and these were, later, used to generate steam. The loss of the kegs brought a strenuous protest from the brewers; but they were informed that due notice and time had been given for the removal of the kegs from the streets and that, in future, these unsightly objects would not be tolerated. The brewery companies promised and, for a time, kept the kegs off the street; but the old conditions soon returned. Again the company wagons gathered up the kegs and this time dumped them into an inaccessible ravine. This last act brought instant relief and the streets of the village were thereafter wonderfully improved.

The next move was the completion of a fence that had been partially built some time since, inclosing the camp. Gates were provided, chained and locked, keys being given to the company drivers only. This necessitated the beer wagons driving over a hill in order to reach the camp. It was explained by the coal company that the streets were practically the playground of the children and, unless the brewery companies contributed toward the maintenance of these roads, they would be prohibited from using them. It is needless to say that this proposition was scorned.

Later, rumor had it that a professional pugilist had been employed by the brewery companies to visit the mine, pick a quarrel with the one responsible for their troubles, and if necessary alter the contour of his features. Deeming it wise to be prepared for an onslaught of this nature, there was in evidence, on the appearance of this party, something that protruded from the hip pocket of the superintendent to which the visitor gave respectful attention. The interview sought was brief, the party in question professing business that demanded his immediate attention.

The advantage thus far gained was followed up by employing a bright boy, who, while pretending to play about the streets, made note of the number of kegs delivered at each house. By comparing these notes with those of the foremen, it was shown that the men who lost the most time from work were those who boarded or lived where the most beer was delivered. These men were called, one by one, to the office and given to understand that, while there was no objection to their drinking in moderation, biweekly sprees and undue loss of time would not be tolerated. Some profited by the advice; but the remainder, failing to comply, there were soon 15 vacant houses, which were quickly filled again by men who were disposed to work and to obey the rules of the company.

The rules were printed in the different languages and posted at the mine. They required that any one desiring to be absent from his place must notify the mine foreman before doing so; and any one remaining idle the day after pay day could not return to work without a written permit from the superintendent. A few of the men adopted the scheme of going to their place and returning in a short time; but these were reported by the foremen as absent and their turns were stopped the following day. In a short time, "blue Monday" was a thing of the past—"an unpleasant memory." The output on that day

equaled that of any other day in the month, and the output of the mine became so steady that, during the two years that followed, there was a difference of only 2000 tons in the annual production of the mines—0.4 per cent. Affairs at the mine took on a new aspect and the men actually became proud of their record for steadiness. The change took six months.

The desire on the part of many progressive companies to make life more attractive to their employees is producing good results. It is true, it is not always appreciated by those benefited. The bath tubs may be used for brooders or coal bins, and sewers as a depository for old clothes, tin cans, etc.; but time will eradicate even this misuse of privileges.

There is one point remaining to be considered. Observation has shown that "dry sections" commonly consume more beer than "wet sections." Where saloons are removed from the vicinity of the mine the last vestige of control is taken away from the mine officials. By the exercise of a half-concealed threat, it is possible to force a saloonkeeper to use his influence toward preventing the loss of time by his patrons, which operates against the interest of the saloonkeeper in preventing the steady operation of the mine.

CHARLTON DIXON.

Pittsburgh, Penn.

The Anthracite Industry

In the articles by "Special Correspondent," COAL AGE, Aug. 9, p. 186, defending the so called "anthracite coal trust," I see no explanation of the two leading facts of my own experience as a user of anthracite coal in a residence furnace; namely, the price and quality of the anthracite coal furnished by coal operators, to the Chicago market, today.

The price of anthracite coal in Chicago, is throughout the year higher than it was before the big strike, and the quality of such coal to be purchased from the best companies in Chicago is much inferior to what it was when there was real competition in quality and price.

The large proportion of stone and slate, in the best coal I could find, has driven me to substitute coke, briquettes, or anything else that will not produce such a large percentage of waste and require so much time, every night, to dig the refuse out of the fire. I would like to ask "Special Correspondent" if the rapacity of the "trust" is not responsible for maintaining the present high prices and working off a poor quality of coal on the consumer. If this is not the case, will he kindly explain the responsible cause.

E. G. EWART,
Link-Belt Co.

Chicago, Ill.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Diffusion of Air and Gases—If the molecules of all matter are assumed to be in a constant state of vibration, it naturally follows that the vibratory movement or force will vary with the density of the matter. In the case of fluids—air, gas, or liquid—the molecules are free to move among themselves, which is not true of solids, whose molecules, normally, hold fixed relations to each other.

If the densities of two fluids are equal, the vibratory force is equal in each fluid; and, at the plane of contact of the two fluid bodies, action and reaction are equal between the vibrating molecules and there is no tendency of these fluids to mix. The laws governing the mixture of liquids is not as simple as in the case of gases, owing chiefly to numerous physical properties of liquids that modify and retard the diffusive action. While the diffusion of gases into each other and into air is extremely rapid, the diffusion of liquids is often very slow and in some cases does not take place at all because of the counteracting forces.

Gases of different densities diffuse into each other and into air. The action is extremely rapid and conforms very closely to certain well defined laws. The diffusion of mine gases into the mine air and into the air current is an important feature of mine ventilation.

Experiment—The diffusion of air and gases has been shown to take place through certain substances with practically the same rapidity as when they are in direct contact. The diffusion of hydrogen into air is well shown by the following simple experiment. A glass tube, say 18 or 20 in. long, 1-in. bore, is closed at one end with a plug of plaster. The tube is first filled with the gas and the open end then immersed beneath the surface of a basin of mercury. At once the mercury is observed to rise slowly in the tube to take the place of the hydrogen that has passed out through the plug and escaped into the air. Investigation shows, however, that while hydrogen has passed out of the tube, some air has pased into the tube, as there remains in the tube a mixture of hydrogen and air.

Law of Diffusion of Air and Gases—By a similar experiment, showing the diffusion of hydrogen into oxygen, Graham found that for every volume of oxygen that passed into the hydrogen, four volumes of the hydrogen passed into the oxygen, the ratio thus being 4:1, in this case. But, calling the density of hydrogen unity or 1, that of oxygen is 16 and $\sqrt{16} = 4$. This and other similar experiments, all confirming the first, led Graham to observe the following law.

Graham's Law—The velocity or rate of diffusion of air and gases is inversely as the square roots of their densities or specific gravities.

This law is simply expressed by the following formulas:

$$\textit{Rel. vel. of diffusion (gas : hydrogen)} = \frac{1}{\sqrt{\textit{density of gas}}}$$

$$\textit{Rel. vel. of diffusion (gas : air)} = \frac{1}{\sqrt{\textit{sp.gr. of gas}}}$$

The Coal Age Pocket Book

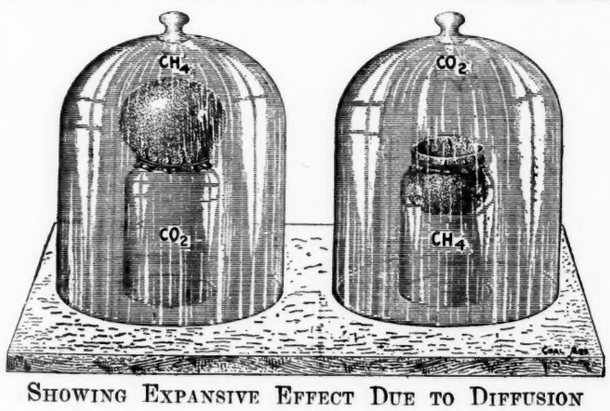
Illustration of Graham's Law—The relative velocities or rates of diffusion of different gases (hydrogen = 1) are calculated from their respective densities referred to hydrogen as unity; thus,

$$\text{Methane } (CH_4);\ \text{density, 8;}\quad \textit{Rel. vel.} = \frac{1}{\sqrt{8}} = \frac{1}{2.828} = 0.354 \quad (H = 1)$$

In like manner, the relative velocities or ratio of diffusion of different gases (air = 1) are calculated from their respective specific gravities, referred to air as unity; thus;

$$\left.\begin{array}{ll} \text{Carbon dioxide } (CO_2);\ \text{sp.gr., 1.529;} & v = \dfrac{1}{\sqrt{1.529}} = 0.808 \\ \text{Methane } (CH_4);\ \text{sp.gr., 0.559;} & v = \dfrac{1}{\sqrt{0.559}} = 1.337 \end{array}\right\} (\text{Air} = 1)$$

Experiment Showing Effect of Diffusion—An interesting experiment, showing the relative increase or decrease of the volume of gas contained in a vessel owing to diffusion, is illustrated in the accompanying figure. The velocity of diffusion of methane being greater than that of carbon dioxide, when the latter is contained in the inner jar and the former in the outer bell-jar the bladder is expanded, because the methane passing into the small jar is greater in volume than the carbon dioxide passing out. Again, the bladder is depressed when the gases change places.



SHOWING EXPANSIVE EFFECT DUE TO DIFFUSION

INQUIRIES OF GENERAL INTEREST

The Calculation of Relative Humidity

Referring to the description of the humidity chart, and the calculation of the relative humidity of air, COAL AGE, July 12, p. 62, I want to ask if you will kindly give the authority for the constants 88 and 30 used in that calculation as I am working along these lines.

L. L. A. MORAN.

Pittsburgh, Penn.

The formula given in this calculation is the Apjohn formula used by Prof. Alexander Buchan, Secretary Royal Meteorological Society, London.

The use of the wet- and dry-bulb hygrometer (psychrometer) depends on the principles that: 1. The relative humidity of the atmosphere is the ratio of the pressure of the water vapor in the air at the time of the experiment, to the pressure of the water vapor at the point of saturation, for the temperature of the air or the dry-bulb thermometer. 2. The actual pressure of the water vapor at the time of the experiment is equal to the water-vapor pressure at the point of saturation (dew point), for the temperature of the wet-bulb thermometer. The water-vapor pressure at the point of saturation is given in psychrometer tables.*

In the use of the psychrometer, if the dew point were known or the temperature at which the weight of vapor present in the air would produce saturation, the vapor pressure corresponding to that temperature, as given by the tables, divided by the vapor pressure for the temperature of the dry bulb would give the relative humidity.

The psychrometer makes it possible to *calculate* the dew-point temperature from the difference of the readings of the wet and dry bulbs, if the barometric pressure is known. To do this, the barometric pressure is multiplied by the difference in the readings of the wet- and dry-bulb thermometers and that product again multiplied by a constant c. The resulting product subtracted from the saturated water-vapor pressure, corresponding to the wet-bulb temperature, as taken from the tables, gives the dew-point pressure, which is the actual pressure of the vapor in the air at the time of the experiment. This actual vapor pressure divided by the saturated vapor pressure for the temperature of the dry bulb, gives the relative humidity of the air expressed decimally. The constant c, varies with the wet-bulb temperature, and has been determined, by a large number of experiments, as calculated by the formula.

$$c = 0.000367(1 + 0.00064\ t_w)$$

Referring to the formula given on p. 62, the constant 30 is practically the normal barometric pressure at sea level, and the constant 88 has been determined by experiment, for temperatures above 32 deg. F. The value of this constant is 96, for temperatures below 32 deg. F. Because the range of ordinary temperatures is comparatively slight, it is possible, with almost inappreciable error, to simplify the calculation by the use of the constants 88 and 30. That these constants practically agree with the formula given above for determining the constant c is shown by a simple calculation. Thus, substituting in that formula, the value $t_w = 50°$ F.,

$$c = 0.000367\ (1 + 0.00064 \times 50) = 0.000379$$

Also, $$\frac{1}{30 \times 88} = 0.000379$$

The formula of Dr. Apjohn is based on the theory that the heat absorbed by the water converted into vapor is taken from the air immediately surrounding the wet bulb and which becomes saturated therewith. The heat thus lost by the air causes the fall of temperature, which is the difference between the wet- and dry-bulb readings. The calculation thus involves the latent heat of the vapor at the wet-bulb temperature, the specific heat of the air, the specific gravity of the vapor, the fall of temperature, which factors when properly assembled determine the ratio of the actual vapor pressure at the time of observation to the total pressure. The formula, partially rational, is corrected by an empirical constant.

*Bulletin No. 235, U. S. Department of Agriculture, Washington, D. C.

Ventilation

Kindly give the best and simplest method of calculating the coefficient of friction in mine ventilation, and explain the solution of the following problem:

In a gangway 5x8 ft., 4000 ft. long, the anemometer reading indicates a velocity of 200 ft. per min. Find the volume of air passing in cubic feet per minute; the pressure producing circulation, in pounds per square foot; the water gage corresponding to this pressure; and the horsepower on the air.

A SUBSCRIBER.

The coefficient of friction, in mine ventilation; or, as it is more properly called, the *unit resistance,* is not calculated, but determined by experiment. It has been found that, under ordinary mining conditions, this unit resistance, or the resistance offered by 1 sq.ft. of rubbing surface to an air current having a velocity of 1 ft. per min. is 0.00000002, which is the Atkinson value abbreviated. The Fairley coefficient, which is often used in mining calculations, is one-half of the Atkinson coefficient, or 0.00000001.

The rubbing surface, area, quantity, pressure, water gage and horsepower are then calculated as follows:

$$s = 2\ (5 + 8) \times 4000 = 104{,}000\ sq.ft.$$

$$a = 5 \times 8 = 40\ sq.ft.$$

$$q = av = 40 \times 200 = 8000\ cu.ft.\ per\ min.$$

$$p = \frac{ksv^2}{a} = \frac{0.00000002 \times 104{,}000 \times 200^2}{40}$$

$$= 2.08\ lb.\ per\ sq.ft.$$

$$w.g. = \frac{2.08}{5.2} = 0.4\ in.$$

$$H = \frac{qp}{33{,}000} = \frac{8000 \times 2.08}{33{,}000} = 0.5+\ hp.$$

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—Find the power of the engine required to operate an endless-rope haulage, for an output of 800 tons of coal per day of eight hours. The mine cars hold 1500 lb., and weigh 900 lb., each. The haulage road is 3000 ft. long and practically level. Assume a speed of 6 miles per hour, or, say 500 ft. per minute.

Ans.—The required output of coal is $(800 \times 2000) \div (8 \times 60) = 3333+$ lb. per min. Allowing no time lost in delays and assuming a coefficient of rolling friction for the cars and ropes, $f = 0.025$, the effective horsepower may be calculated by the formula

$$H = \frac{fl}{33{,}000}\left[O\left(1 + \frac{2\,w_c}{w}\right) + 2\,w_r v\right]$$

Substituting in this formula the following values: $f = 0.025$; $l = 3000$ ft.; $O = 3333$ lb. per min.; w (coal) $= 1500$ lb.; w_c (car) $= 900$ lb.; w_r (rope) $= 1.58$ lb. per ft.; $v = 500$ ft. per min.,

$$H = \frac{0.025 \times 3000}{33{,}000}\left[3333\left(1 + \frac{2 \times 900}{1500}\right) + 2 \times 1.58 \times 500\right]$$

$$= 20+ \text{ hp.}$$

Ques.—The timbering or lining of a hoisting shaft shows signs of collapse. State how you would temporarily secure it, and describe what measures you would adopt in renewing the timber.

Ans.—In order to temporarily secure the bulging timbers on the face of the shaft, extra cross-buntons should be inserted wherever these will not interfere with the hoisting operations; or, if necessary, hoisting must cease until the shaft can be repaired.

The work of renewing timbers in a shaft should be started at the top and proceed downward. Only such timbers should be taken out at one time as are necessary to permit the insertion of the new timbers. The latter should be of sufficient thickness to give the required strength to support the strata. The new timbers should be lagged or packed as tightly as possible behind, so as to give the required support to the strata. Permanent cross-buntons should be inserted at regular intervals, and the work should be done in a substantial manner. Suitable provision should be made, as may be required, to drain the space behind the timbers and conduct the water to the foot of the shaft.

Ques.—Name the principal gases found in coal mines that are chemical mixtures and also those that commonly form a mechanical mixture in the mine.

Ans.—Methane, or marsh gas (CH_4), is a chemical compound, the molecule consisting of one atom of carbon and four atoms of hydrogen; olefiant gas (C_2H_4), consisting of two atoms of carbon and four of hydrogen; carbon monoxide (CO), consisting of one atom of carbon and one atom of oxygen; carbon dioxide (CO_2), consisting of one atom of carbon and two atoms of oxygen; and hydrogen sulphide (H_2S), consisting of two atoms of hydrogen and one atom of sulphur. All of these gases, as they occur in mines, are more or less mixed with air, in varying quantities, forming mechanical mixtures of air and gas. Air itself is a mechanical mixture, consisting of, practically, four parts, by volume, of nitrogen and one part, by volume, of oxygen.

Firedamp is a mechanical mixture, consisting of methane or marsh gas and air, in explosive proportions, together with varying quantities of other gases, which more or less modify the character of the firedamp. These other gases may or may not be present in the firedamp. Afterdamp is a mechanical mixture, consisting principally of nitrogen and carbon dioxide, together with varying quantities of unburned marsh gas, carbon monoxide and water vapor. Blackdamp is a mechanical mixture consisting, chiefly, of carbon dioxide and nitrogen, in varying proportions. Whitedamp is another name for carbon monoxide as it is found in the mines mixed more or less with air.

Ques.—In a nongaseous mine, where would you locate the main-haulage road, on the intake or the return airway, and why?

Ans.—While the main-intake airway should be made the haulage road in a gaseous mine, to avoid the danger of the ignition of the gas in the return-air current by the lamps of the drivers, it is more practicable, in a nongaseous mine, to make the return airway the haulage road. The reason is that, by so doing, a blower fan can be used and the mine ventilated under a pressure greater than that of the atmosphere. The gases generated in abandoned workings are then driven back and escape by any crevice or break to the surface. The mine is thus kept freer from gas than under the exhaust system.

In the use of the blowing system of ventilation, it is necessary to make the return airway the haulage road, in order to avoid the use of doors at the shaft or slope bottom. For the same reason, in the use of the exhaust system, it is necessary to make the main intake the haulage road.

Ques.—If the percentage of gas in the main return of two air splits is 2.5 per cent., and there is 0.75 per cent. of gas in one of these splits, what is the percentage of gas in the other split; there being 20,000 cu.ft. of air passing in the former and 30,000 cu.ft. of air in the latter?

Ans.—The total volume of air passing in the main-return airway coming from these two splits is $20{,}000 + 30{,}000 = 50{,}000$ cu.ft. per min. The volume of gas in this return current is then $50{,}000 \times 0.025 = 1250$ cu.ft. per min. In like manner, the volume of gas generated in the first split is $20{,}000 \times 0.0075 = 150$ cu.ft. per min. The volume of gas generated in the second split is therefore $1250 - 150 = 1100$ cu.ft. per min. This makes the percentage of gas in the second split

$$\frac{1100 \times 100}{30{,}000} = 3\tfrac{2}{3} \text{ per cent.}$$

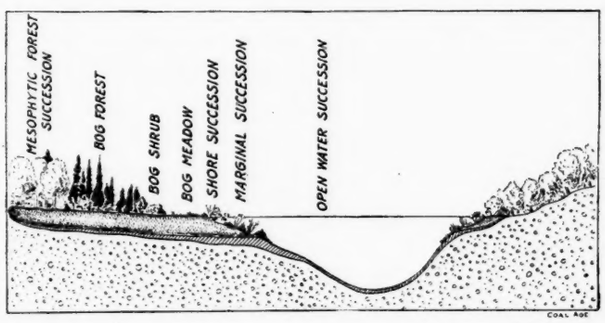
This answer assumes that the given volumes are measured at the return end of each split.

BOOK REVIEW DEPARTMENT

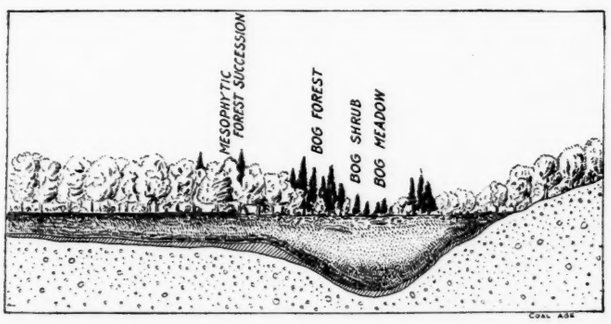
PEAT DEPOSITS—By Alfred Dachnowski, 392 pp. with 32-page index; 6½x9⅝; 1 map, 8 plates, 29 figures. Geological Survey of Ohio, Fourth series. Bull. 16. Cloth boards. Price, 75c.

This book was prepared with the coöperation of the Bureau of Mines, but we think that the main part of the assistance rendered consisted in the making of analyses and in the article on "The Uses of Peat," by Charles A. Davis. Certainly the clarity and simplicity of the bulletins of that admirable institution are not apparent in this report. When we have subjected the newer scientific expressions in many sentences to careful examination and then endeavored to extract the sense from such passages, we have found ourselves somewhat nonplused for the construction is as involved as the terminology is unusual.

However, this charge covers all the faults of the book. It is a most scholarly addition to the study of peat deposits dealing with the subject from economical, ecologic, agronomic and phytologic points of view, to make use of the author's own expressions. The study is of no little interest, though the present bogs are not tenanted by the same plants, as those of the carboniferous era, nor are they growing in soils analogous to those from which our coal beds sprang.



THE EARLY APPEARANCE OF A LAKE, HAVING VEGETATION SUITED TO FREE WATER



THE LAKE DEVELOPS INTO A BOG, THE EARLY DEPOSITS OVERLAPPING OLDER

They show a great variety of conditions derived partly probably from the variant nature of the component plants, the different characters of their soil foods and the unequal progress of the processes of decay. Thus the nitrogen in one moisture-free sample in Big Spring Township, Seneca County, ran 3.48 per cent. Had it been moisture- and ash-free, the figure would have been increased to 4.33 per cent. On the other hand, the nitrogen content in a moisture-free sample may fall to 1.01 per cent. in a peat where the ash present is only 8.45 per cent.

Sulphur also varies from 4.57 per cent. to 0.21 per cent. As the ash in the first sample is 22.14 per cent. the ash- and moisture-free sulphur content would rise to 5.88 per cent. The latter sample has only 7.59 per cent. of ash. Only occasionally is pyrite mentioned as being present. It does not appear that the ash, nitrogen and sulphur have any regular relationship. It is only by chance that the figures we give show at once high sulphur or high nitrogen and high ash. One peat with 45.08 per cent. of ash has only 0.35 per cent. of sulphur, the nitrogen being 2.30 per cent.

The large amount of sulphur in these Ohio peats is an evidence that if coal were formed today it would have as large a percentage of sulphur as coals of the carboniferous system. Vegetation now as then serves as a concentrator of all sulphur-trioxide compounds in soil and waters.

The author names the various plants which occur together in the peat bogs. These groups occur in a regular determinable succession, one group at the bottom and the other at margins of the lagoons from which the bogs are formed. The illustration shows these "successions" as the author terms them in their order. The book is extremely interesting and everyone who esteems himself a geologist or a botanist should have it in his library, not so much for the local facts, which are themselves extremely valuable, as for the broadened view the reader will obtain of the conditions determining vegetable growth and the deposition of coal.

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EXPLOSIVES. A SYNOPTIC AND CRITICAL TREATMENT OF THE LITERATURE OF THE SUBJECT AS GATHERED FROM VARIOUS SOURCES. By H. Brunswig. Translated and annotated by C. E. Monroe and A. L. Kibler, George Washington University. 322 pp. and index; 5¼x8¼ in., 45 ill.; John Wiley & Sons, New York, Cloth Boards. Price, $3.

Who Dr. Brunswig is, we do not know and the authors do not enlighten us, but it must be conceded that his book bears translation and the careful reading of the student. The original work is dated January, 1909, so that the information is quite reasonably up to date, though, of course, it does not treat explosives from an American mining standpoint. If it had not been for the mysterious words "Part 1" appearing at the head of the table of contents and of the first reading page, we would have thought it a complete treatise on explosives. More, of course, could be written, but the view taken seems to comprehend the whole field from a popular point of view. The subjects considered are. General behavior of explosive systems, velocity pressure, temperature, flame and products of explosive reactions, explosions by influence, and the properties of explosive bodies. Then igniters, fuses and detonators, mercury fulminate, propellants and blasting explosives are discussed. It may be noted that the book gives the bulk of its attention not to military but to civil explosives.

It is essential that this subject be understood by mine managers. In English examinations for such officials, stress is always laid on such knowledge and the emphasis is justified by the importance of the subject.

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AIR COMPRESSION AND TRANSMISSION, by H. J. Thorkelson, associate professor of steam and gas engineering, University of Wisconsin; 200 pp., with index, 6x9¼ in. Copious illustrations, also tables and diagrams. McGraw-Hill Book Co., 239 West 39th St., New York City. Cloth boards. Price, $2.

Mr. Thorkelson has written this book to meet the needs of the ordinary engineer. Turning the pages over one is confronted with a few integration signs and is disposed to think that the book is not suited for the use of beginners. But in all, the sign is used only seven times and is found only on two pages which occur consecutively. Avoiding these few paragraphs the reader who is seeking for elementary methods of presentation will not once be offended unless he feels that everything is made too explicit and that too much space is devoted to bedrock principles. In an appendix, Mr. Thorkelson even explains the use of logarithms. But though it is true that this little volume is suited to the use of beginners yet it covers the whole field—decompression, ventilation, rotary blowing machines, fans and their design, piston compressors, turbine blowers, hydraulic compression, the effect of altitude, the measurement of compressed air and the care of compressors. It is not written from the point of view of the colliery engineer, but it nevertheless will be found of great value to him in solving his problems and in explaining the wherefores of his compression machinery.

COAL AND COKE NEWS

Washington, D. C.

Statements have been given out by the American Mining Congress with reference to the 16th annual convention of that body which is to be held in Philadelphia during the latter part of October, a feature of which will be a display of mining machinery.

Special attention is to be paid to the problem of safety for miners, both in the discussion and in connection with the exposition of machinery. All classes of safety devices will be on show and there will be demonstrations of operation in order to furnish tests of efficiency. It is expected that there will be large representations from the West because of the supposedly greater advance that has been attained in that part of the country with respect to protection of human life.

Three special transcontinental trains will be run, one from Los Angeles, one from San Francisco, and one from Seattle, picking up men from all of the important mining communities in the West. A special train will also be run by the iron and copper men of Minnesota and Michigan and two trains are expected to be sent from Chicago. A fully equipped mine-rescue car will probably be loaned by the State of Illinois.

The Pennsylvania coal companies will also place on display a number of rescue cars and it is intended to have a working coal mine fitted up in the basement of Horitcultural Hall where the mining show is to be held. The Bureau of Mines will have its methods exemplified by demonstration and there will be moving pictures illustrating the use of safety appliances.

James F. Callbreath, secretary of the Mining Congress, says with reference to the exhibition that:

The mining industry in the past has been the victim of misunderstanding and ignorance. As a result of all this, serious problems have arisen and we are going to attempt to solve some of them at this great national rally. Because of this general misunderstanding, the burden of taxation upon the mining industry in recent years has been so largely increased in many states that the mining enterprises have ceased operation. In others an undue handicap has been placed upon competition with states operating under less burdensome conditions; and in other states a double system of taxation is required—first upon the total value of the property, and, second, upon the output. A careful discussion of this subject will be presented at the convention and after a thorough consideration it is hoped that the convention will agree upon a general theory upon which a proper system of taxation shall be based.

A Possible Dissolution

Attorney-General McReynolds has announced his intention to file a suit, under the Sherman law, attacking the Philadelphia & Reading Coal & Iron Co.'s control, through stock ownership, of the Central R.R. of New Jersey. He has already filed a suit against the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co. (a selling concern only—the Lackawanna mines are owned outright by the railroad) in an attempt to undo the steps by which the Lackawanna management sought to meet the requirements of the "commodities clause" of the Hepburn act. These two steps sufficiently indicate the desire of the Attorney-General not only to "get at" alleged railroad combinations in the anthracite field, but also to divorce the anthracite industry from transportation.

Any separation of the Reading railroad and coal properties would bring up problems in connection with that concerns general mortgage, under which stocks of both railroad and coal companies are pledged. Obviously these would not stay the hand of the court, if that body were convinced that existing relations were illegal. A way out of the mortgage difficulty would be found by the litigants or pointed out by the court. A more serious question for the company would be whether a purchaser could be found, and on what terms, for a property which pays only 1 per cent. to 2 per cent. on a debt of $73,000,000, or, including the money spent on "new work at the collieries," less than 4 per cent.

After freeing its coal-company stock from the lien of the general mortgage, the Reading company could distribute that stock, together with the coal-company debt, in the form of income bonds or stock, to its own stockholders, provided such a method were approved by the Supreme Court. It would evidently meet the opposition of the Attorney-General.

But, even if the company were compelled to sell its coal properties to strangers, it could probably do so without great loss of earning power. So far as either the Sherman law or the commodities clause is concerned, its rigid application would not necessarily be destructive of or injurious to the investment value of Reading shares. It probably would not, by itself, seriously impair earning power. A more serious possibility is that of a conjunction of such divorce proceedings and a general reduction of freight rates on the carriage of anthracite to market.

So long as the mines and the railroads are under a common corporate ownership, the individual owners of the combined properties remain immune from the effects of whatever coal freight-rate reductions may be made. As it stands the Reading company is prepared to gain as a coal merchant what the Interstate Commerce Commission may take from it as a railroad, except as to the minor portion of the coal it handles which the "independents" produce. The commission now has under way a broad inquiry into anthracite rates.

HARRISBURG, PENN.

Among the matters to be considered at the tri-district board meeting of the United Workers of the anthracite region, to be held at Wilkes-Barre is the enforcement of the anti-docking bill, which goes into effect the latter part of this month.

The author of the bill, Representative Lenker, of the Lykens Valley district, will probably attend this meeting and give the boards the intent of his bill, and the attorney of the union will give an interpretation of the bill, as to its legal status.

The question of presenting a demand to the coal companies for a "check-off" dues system will be discussed. However, none of the officials of the union will talk on this particular question. It is thought that the independent operators, at least some of them, are favorable to introducing the "check-off," as it will eliminate many petty strikes now arising over buttons, but not much hope is held out that the large companies will agree to the proposition.

A labor forward movement in the anthracite region was inaugurated recently at a mass meeting held at Pottsville. One of its purposes is to solidify the unions of the several craftsmen of this region. The miners are taking an active part in this movement, and it is expected that President White, of the United Mine Workers, will be in Pottsville on Labor Day, Sept. 1, to make an address.

The greatest interest is being shown, not only in labor circles, but by the public generally, in the contest about to be waged in Philadelphia between the American Federation of Labor and the Industrial Workers of the World for leadership among the wage earners.

The success achieved by the I. W. W. in some parts of the state gives cause for apprehension. While a good many people are not in sympathy with all of the methods pursued by the Federation, they are vastly preferable to the prepaganda set on foot by the I. W. W. This latter organization was not very successful in the anthracite region, but is now carrying on a strenuous campaign in the bituminous fields. It is, therefore, with no small degree of anxiety that the contest for supremacy in the principal industrial city of the state is being watched.

PENNSYLVANIA

Anthracite

Hazleton—G. B. Markle & Co., operators of the Jeddo, Highland, Oakdale, Ebervale and Harleigh collieries, among the largest in the anthracite region, have announced that they will erect a hospital at Highland for the temporary care of employees injured in their mines. The hospital will be equipped with modern first-aid appliances.

Wilkes-Barre—A settlement has been made between the Lehigh and Wilkes-Barre Coal Co. and the officials of the county, whereby the county pays back $9450 in excess taxes under the 1907 triennial assessment, while the company pays $18,042 as a balance due on the 1910 triennial assessment.

The trouble and dispute arose over the increase of coal-property assessment six years ago, when the value of coal was raised from $50 to $67 per foot-acre. In a case of ap-

peal the local court reduced the valuation and it was further reduced by the Supreme Court to approximately $49 a foot-acre, or by the superficial acre from $2793 to $1920 an acre. An appeal was taken in the 1910 valuation, but was not tried out in the courts and the coal companies attempted to adhere to the value fixed by the court on the 1907 assessment, so after a long conference during the week the settlement was reached.

Pottsville—The Philadelphia & Reading Coal & Iron Co. has given its assurance to the widows of the men killed in the East Brookside mine on Aug. 2, that it will continue them upon its payroll indefinitely. The widows of the bosses who were killed will each receive $72 and the other women will each receive $40 per month. In addition also each widow will be given $80 in cash at once.

Bituminous

Charleroi—The work of building the new steel tipple for the Carnegie Coal Co., at Charleroi, to take the place of the structure destroyed some two years ago, when the property was owned by the Charleroi Coal Works, is progressing rapidly.

Myersdale—James A. Kirkpatrick and son, J. B. Kirkpatrick, who recently opened a new mine near Addison, on the C. & O. branch of the Baltimore & Ohio, report that the work is progressing rapidly and that they will soon begin shipping coal. Mr. Kirkpatrick was for several years superintendent of the Southern Coal Co., at Casselman.

Rockwood—The new mining operations of Black Brothers near Wilsoncreek is now placing its mined product in stock preparatory to shipping it over the branch road that is being constructed from the mine to the Baltimore & Ohio main line near McSpadden Station. Meanwhile, several hundred dwellings are being erected for the miners and their families and soon the place will have all the earmarks of a prosperous mining town.

Johnstown—For the first time since the purchase of the holdings of the Kelso Mining Co., the mines were operated by the J. Blair Kennerly interest on Aug. 11. These mines adjoin those of the Valley Smokeless Coal Co., which is a holding of the Kennerly company. The output of the Kelso mines is about 500 tons per day. Extensions will be made shortly, providing for the operation of some coal lying between the Valley Smokeless Coal Co.'s mines and those of the Kelso on a royalty basis.

WEST VIRGINIA

Eccles—The miners of the New River Colliery Co., at Eccles, had called a strike to take effect on Aug. 12, but representatives of the union instructed the men to return to work pending a hearing of their grievance by the Arbitration Board. The miners had been digging coal by the car and demanded that the company should put in scales and weigh their output.

Bluefield—It is stated on good authority that the Berwind-White interests have purchased the plant of the Piney Colliery Co., on Piney Creek, in Raleigh County. This property contains approximately 3000 acres of coal land and has been shipping about 25,000 tons monthly.

The Pocahontas Coal Mining Co., Inc., has been recently organized in Virginia. The general offices will be in the Seaboard Bank Bldg., at Norfolk, and Thmas T. Boswell will be president and Edward T. Boswell, vice-president and general manager. These latter gentlemen will, however, have their offices in Baltimore. The present plans of the new company include the opening of a mine in the seam now being worked, while three openings will be made in the celebrated Red Ash seam, which heretofore has remained untouched. A new power plant will be built at an early date and coal is expected to be shipped within a short time.

Charleston—A wage agreement has been signed between the Loop Creek Coal Co., of Page, Fayette County, and the officials of district No. 29 United Mine Workers of America. This gives the men a substantial increase in wages and other benefits including the abolition of the mine guards. About 600 men are affected by this settlement, which is undrstood is entirely satisfactory to employers and employees.

KENTUCKY

Middlesboro—The Wallen's Creek Coal Co., near Middlesboro, Ky., recently suffered the loss of its tipple by a fire of unknown origin, causing damage amounting to about $10,000. It will be some days before shipments can be resumed. F. P. Wood and other Pineville, Ky., men, were the owners of the property.

Masu—The discovery of two veins of what is reported to be the best coal in the Perry County field, neaer Masu, 12 miles south of Hazard, on the Brashear tract of 4000 acres, was somewhat surprising to those familiar with the field, as it was a mooted question whether there was any coal to be found in paying quantities on this tract. A. C. Rineheart, of the North Fork Coal & Timber Co., which controls the property, will at once take steps to open up operations, and will install a large plant.

Lexington—The board of examiners of the Kentucky Mining Department recently awarded first- and second-class certificates to a number of miners who took the examination for mine foreman at Lexington, six first-class and 27 second-class certificates being given. Twenty-nine of the 33 candidates examined had just completed the eight weeks' course for miners given in the College of Mines and Metallurgy of the State University. The board will hold its next examination Aug. 25.

OHIO

Columbus—Considerable development work is being done in the Pomeroy Bend district of Ohio. The Kanawha & Michigan R.R. Co. as well as the Hocking Valley is building a line into the heart of the coal fields and as a result three new mines will be opened in that section in the near future.

The Calvin-Essex Coal Co. is preparing to open two mines and the Peacock Coal Co. will soon open one. The latter concern was a small river proposition, but with the extension of the railroad lines will become a larger producer. The development of the Pomeroy Bend field in Ohio has just commenced.

INDIANA

Clinton—Shaft sinkers employed at the Ben R. Whitcomb mine, four miles northwest of Clinton, have passed through coal at a depth of 120 ft. The No. 5, or top seam, at this point is 4 ft. 8 in. thick, and has a roof of black slate 3½ ft. thick. Drillings have shown that there are two other workable beds below this one, No. 4, which is 4 ft. thick, 100 ft. below No 5; also No. 3, 6 ft. thick, 75 ft. below No. 4. With these prospects in view the above mine promises to be active for many years to come.

Terre Haute—The receivers and owners of the Chicago & Eastern Illinois R.R. have decided to abondon the extension of the St. Louis & Chicago division into Peoria. This branch left the main line at St. Elmo, and was to run 35 miles to Chatham, from whence to Peoria the Alton tracks were to be used. The receivers have, however, just made an appropriation of $3,000,000 for improvements, new locomotives, rails and general increase in freight facilities.

Linton—A force of men began work recently on the new Templeton mine, which, when completed, will employ two hundred men.

ILLINOIS

Duquoin—The Security mines here recently made another local record by hoisting 2250 tons of coal in one day.

Springfield—Superior facilities for mining coal in and around Springfield are blamed by northern Illinois operators for the gradual decline of the mining industry around Coal City and Wilmington. Many miners have left that section of the state to work in Central and Southern Illinois coal fields.

Belleville—Attorney T. R. Mould has filed suit in the Circuit Court for Mrs. Barbara Hildebrandt, executrix of the estate of the late Fred Hildebrandt, against the Colb Coal Co., of Mascoutah for $10,000. This suit arises over the death of Hildebrandt, who on June 3 last was caught under a fall of slate and coal and instantly killed. It is charged that the company failed to have a mine boss in the mine.

Chicago—The Pana Coal Co., of Pana, Ill., has passed into the hands of receivers, by order of the court. The action was made on petition of the Continental & Commercial Trust & Savings Bank, of Chicago. The company's failure to take up and cancel its original issue of $100,000 worth of bonds is understood to have brought about the action. The two mines of the company, which are valued at $400,000, and which are good producers, will continue in operation.

Harrisburg—Dillie Carter, formerly a mine inspector at the Seagraves Mine, north of here, was found guilty in the county court of violating the state mining laws. It was charged that Carter's violation caused the explosion at the mine last winter, in which four men were killed and a number seriously injured.

New Baden—The charter of the miners' local at New Baden, Ill., has been revoked on account of the miners' refusal to work in the two mines of the Southern Coal & Mining Co., after a fine had been assessed against the miners for their refusal to load pit cars above a certain weight. The state organization sided with the operator, but the miners refused to work. It is understood that a new local will be organized and work will be resumed in a short time.

MISSOURI

Moberly—The heirs of J. T. Smith, of Fremont, Neb., recently purchased 1000 acres of coal land belonging to the Eagle Coal & Mercantile Co., a Kansas corporation. The property will be developed at once. Headquarters of the new company will be in Moberly.

KANSAS

West Mineral—It has been known for years that an upper bed of coal of an average thickness of 24 in. underlies the surface of the entire northwestern quarter of Cherokee County. A few days ago a petition signed by 500 miners was sent to Alexander Howatt, president of District No. 14, United Mine Workers of America, asking him to meet the operators and endeavor to secure a scale of wages for working this seam of coal.

ARKANSAS

Little Rock—On Aug. 11, thirty miners and employees of the Arkansas Western Coal Co., with mines at Bates, filed with the State Commissioner of Labor a petition asking that he take action against the above named company on the grounds that it had failed to pay its men. The miners set forth that they had been employed by the coal company for four weeks since their first wage was due, and that two weeks more had passed since the date of their second pay-day, but on neither occasion had they received their proper remuneration.

COLORADO

Oak Creek—Shipments of coal from the mines of the Oak Creek district last month amounted to 827 cars, the largest amount ever shipped out of Routt County in the month of July and an increase of 61 cars over the record for the corresponding month last year. Another record was also broken in the fact that for the first time in the history of the district July showed an increase over the month of June.

Denver—It is expected that 10,000 miners employed in the southern Colorado coal field will go on strike unless negotiations between Frank J. Hayes, international vice-president of the United Mine Workers of America, and officials of the operating companies for recognition of the union are successful. Besides a recognition of their organization, the employment of check weighmen at the mines, the abolition of the contract system, and the dismissal of Baldwin-Felts guards, the men demand a more strict observance of the anti-scrip law and the right to openly attend meetings of their union.

WASHINGTON

Seattle—Seven hundred miners employed by the Pacific Coast Coal Co. in three collieries at Black Diamond, 25 miles southeast of Seattle, walked out Aug. 11 because the company refused to reinstate George Ayers, who was discharged after a quarrel with a foreman. Ayers is an organizer of the Industrial Workers of the World.

FOREIGN NEWS

Colon, Panama—After having had the anthracite deposits on the Rio Indio reported upon by engineers, J. M. Hyatt, former American vice-consul at this port, has left for New York to attempt the financing of this deposit.

Vancouver, B. C.—The provincial executive at a special session in Victoria on Aug. 13 decided to order several militia companies to Nanaimo. The striking coal miners at that place and also Ladysmith appeared to be pretty nearly masters of the situation; hence the decision to call out the provincial troops.

Tampico, Mexico—Rebel activities in the oil fields is curtailing activities greatly and it is feared that the railroad contracts cannot be supplied unless relief comes soon. While a number of engines on most of the roads have been reconverted to coal burners, serious tying up of traffic is certain. Another problem is the coal supply, which is not sufficient to take care of the suddenly increased demand.

PERSONALS

Charles Carrol, former superintendent of the Bunson Coal Co., at its Indiana mines, has been appointed assistant superintendent of the Granville district by Thomas Moses, general manager of the company.

Charles Hoebel, superintendent of Rex No. 2 coal mine of the LaFollette Coal, Iron & Ry. Co., resigned that position recently, and H. Bevan, superintendent of the Rex No. 1 mine was made superintendent over both operations.

Although his term of office expired some time ago, John Laing, state mine inspector of West Virginia, will remain in office until a man can be found to fill his place. There have been no less than 51 applications for this position.

After being threatened with total blindness for several years, John Markle, of Jeddo, Penn., is recovering his sight. He recently returned from Europe, where he has been taking special treatment and now declares that his sight is improving steadily.

CONSTRUCTION NEWS

Philadelphia, Penn.—The Pennsylvania Southern will expend $200,000 on an extension in Clarion County to tap newly opened coal fields.

Sonman, Penn.—The Sonman Shaft Coal Co. is carrying out a plan of extensive improvement at its operations here. A new B. & W. boiler of 500 hp. capacity is being installed.

Woodward, Ala.—The H. Koppers Co. is installing a second battery of 80 byproduct coke ovens at the plant of the Woodward Iron Co. at Woodward, Ala. Work on the battery of 68 ovens of the same type for the Republic Iron & Steel Co. at Youngstown, Ohio, is being rushed with a view to their being placed in operation in the early Fall.

California, Penn.—A company will be organized shortly for the purpose of building a trolley line from California to several mining towns along the Monongahela River, including Granville, Centerville, Vesta No. 5, Fredericktown and Millsboro in Washington and Greene Counties. Rights-of-way have already been secured for the greater part of the distance.

La Follette, Tenn.—The La Follette Coal, Iron & Ry. Co. is building a four-track steel tipple provided with shaking screen at its Rex No. 2 coal mine near La Follette, to replace the wooden structure burned at that place a few months ago. The steel tipple was designed by Myer & Whaley, of Knoxville, Tenn., is being fabricated in Pittsburgh and will be erected by the coal company.

Louisville, Ky.—Actual work on the pipe line which will convey natural gas to Louisville from the West Virginia field by way of Inez, Ky., has been begun at two different points in the state. Ground was broken simultaneously at the edge of the Kentucky River at Frankfort, and near Paintsville in the eastern Kentucky mountains. The proposed line will be about 200 miles long and will cost $3,000,000.

Connellsville, Penn.—F. J. Harry & Co. have been given contracts by the Pittsburgh Coal Co. for three shafts at Hill Staion, 17 miles from Pittsburgh, on the Washington branch of the Panhandle R.R. The contract includes the sinking of a shaft 200 ft. deep, the pumping of water out of two shafts that have been idle 15 years, the concreting of these two shafts and the driving of two main headings 1800 ft. long, and lining them with reinforced concrete.

Pottsville, Penn.—The Pennsylvania R.R. Co. has awarded a contract for building a track to extend from a point near Gilberton station, west to the new operation of Madeira, Hill & Co., between Frackville and Mahanoy Plane. The estimate calls for 300,000 cu.yd. of excavation, which, with grading, is to be finished by January, 1914. The new breaker which Madeira, Hill & Co. will build at the end of this line will prepare the output from the old Lawrence colliery and the Bear Ridge, which are being reopened in addition to that of the Brookwood mine, which is now in operation. This will mean a breaker of immense capacity.

NEW INCORPORATIONS

Paris, Tenn.—A new coal and ice company has been organized here. The capital stock is $20,000, and each shareholder is limited to four shares of $25 each.

Belleville, Ill.—The St. Clair County Coal & Mining Co. has been organized with a capital stock of $1500, to produce coal for local and shipping markets. The incorporators are Val. F. Lauf, Mary A. Lauf and F. Kissell.

Huntington, W. Va.—At a meeting of the officers of the Millard Creek Coal Co., with over two-thirds of the members present, it was decided to raise the capital stock from the present amount of $25,000 to $500,000.

Harrisburg, Penn.—A state charter has been granted to the Panther Creek R.R. Co. to build a 25-mile line from near Nesquehoning to a point near Tamaqua, with a capital stock of $250,000. S. B. Warriner, of Philadelphia, is president.

Terre Haute, Ind.—The Kettle Valley Mining Co. has been organized at Terre Haute for mining and trafficking in coal. Its capital stock is $75,000, and the incorporators are Cyrus E. Davis, Albert Seifert, Christian A. Hansing, Joseph W. Frisz, and Arthur L. Kelso.

Wheeling, W. Va.—The Virginia & Montana Mining Co. has been organized with an authorized capital of $10,000, to acquire mineral claims and develop mineral lands in Lewis & Clark County, Mont. The incorporators are John E. Schellhase, Wm. H. Pfarr, J. T. Goodwin, Geo. B. Maxwell and W. H. Chapman, all of Wheeling, W. Va.

Rivesville, W. Va.—Ohio capitalists have formed the Rivesville Coal Co. to mine coal in Marion County, W. Va. The authorized capital stock is $75,000, of which $7500 is subscribed and $5000 paid in. The incorporators are R. A. Pollock, of Massillon, Ohio; P. B. Pollock and Wm. Brogden, of Canton, Ohio; Frank Stoner, of Massillon, and Wallace Dixon, of Canton.

Ottumwa, Iowa—A new coal-mining company, to be known as the Bidwell Coal Co., filed articles of incorporation Aug. 11. The new corporation is established at Bidwell, Ia., and will do a general mining business. The capital stock of the company is $50,000, and the officers are: John Ramsey, president; John Shuler, vice-president, and Homer H. Harris, secretary and treasurer.

Blairsville, Penn.—The Wilbur Coal Co. has been incorporated with a capital stock of $100,000. This company was organized to develop about 1000 acres of coal lying on the east side of Stony Creek, about two miles from Hooversville and near the Otterbein church. The incorporators are: J. W. Campbell, of Philadelphia; James A. Hill, of New York; Telford Lewis, of Johnstown, and W. P. Graff and F. M. Graff, of Blairsville. The work of development has already been started.

INDUSTRIAL NEWS

Wellsville, Ohio—The new Salisbury Mine, together with the property of the Buckeye Clay & Coal Co., has been sold at private sale by Trustee Frank McCord, of Lisbon, to Henry W. Rumsey, of Chicago, for $23,200.

Pottsville, Penn.—The Lehigh Valley Coal Co., owner of the land occupied by Maysville Park, has discovered a rich bed of coal directly underneath the pavilion, and will prepare to mine the same in the near future.

Hatfield, W. Va.—The Mary Helen Coal Co. is installing a retarding conveyor to take the place of its present system. It is of the rope and button type, 150 ft. long on a slope of 33 deg., or 65% with a capacity of 60 to 100 tons per hour. This equipment was furnished by the Fairmont Mining Machinery Co., Fairmont, W. Va.

Denver, Colo.—Rumors that the coal road of the United States Smelting, Refining & Mining Co. has been sold to the Denver & Rio Grande R.R. Co. have been denied. Work on both ends of the line is going on, and only a tentative agreement with the Rio Grande has been entered into for the hauling of coal.

Careyville, Tenn.—The Sun Coal Co. will install a 375-k.v.-a. Curtis turbo-generator with 14-kw. exciter, one 150-kw. motor-generator set, switchboard and accessories, and will place in operation in the mines two new 8-ton electric mining locomotives. The equipment has all been ordered from the General Electric Co.

Unalaska, Alaska—A cargo of Australian coal has been recently delivered at Unalaska for the use of government vessels, and after a voyage of 8000 miles will cost approximately $15 per ton. A short distance inland from Unalaska lies the much talked of but undeveloped coal ranges which are supposed to contain coal of a superior quality.

Chicago, Ill.—Moving pictures are to be utilized by the Illinois Central R.R. to instruct its employees in the burning of coal to the best advantage. Last year thé road used 4,400,000 tons. The saving of one shovelful in every ton of this fuel would have saved $88,000. Lessons will be given by the movies on the firing of locomotives and large amounts of time and energy thus saved.

Wheeling, W. Va.—Representatives of coal interests keeping in the background are taking up options on a considerable block of coal land in the southern part of Belmont County. They have been at work for some time past, and it is understood, have secured options on a considerable acreage, that has been overlooked by operators who have been buying coal in that section the past few years.

New Orleans, La.—With the withdrawal of the tug "Mamie Coyle" to Memphis, one of the landmarks of the coal trade in the harbor here has passed. The "Mamie Coyle" was sold recently to the Memphis Bridge Co. by W. G. Coyle & Co., local coal dealers. She had done duty in this harbor for 43 years. The boat was built in Chester, Penn., in 1870. Despite her long usage the tug sold for $12,000.

Washington, Penn.—J. Howard Clarke recently purchased the Pittsburgh vein of coal underlying the farm of his deceased uncle, the late Harvey H. Clarke, of South Franklin Township, the price paid being $200 per acre. The location of this coal is the upper Chartiers Valley on the Eastern side of and near the crest of the Washington anticline. As the area in question covers 260.66 acres, the consideration totalled $52,133.40.

Washington, D. C.—The Senate on Aug. 15 cleared the way for work to be started at the new site of the Bureau of Mines in Pittsburgh, when it authorized the Treasury Department "to accept such funds as may be received by contributions from the State of Pennsylvania, or from other sources, for the purpose of enlarging by purchase, condemnation, or otherwise, and improving the site authorized to be acquired by the Bureau of Mines."

Pittsburgh, Penn.—An agent, said to represent a prominent real estate dealer of Pittsburgh, has been at work in the Bradley Junction coal field, securing options on a large tract of coal that has not passed into the hands of any of the numerous companies doing business in that section. The field lies in corners of Cambria, Carroll and Allegheny Townships, and was under option to Kirsch Bros., of Nicktown, until a short time ago.

Pittsburgh, Penn.—The Rochester & Pittsburg Coal & Iron Co. will place in operation new electrical apparatus consisting of a 200-kw. rotary converter, twelve 40-k.v.-a. and three 75-k.v.-a. transformers, and a 100-hp. motor; also a 300-kw. rotary converter, three 110-k.v.-a. transformers, and fifty 5½-hp. and fifteen 7½-hp. motors. Thirteen new 6-ton and eleven 10-ton electric locomotives will be operated in the mines. All this apparatus has been ordered from the General Electric Co.

Washington, Penn.—C. N. Savage, on behalf of Wm. E. Jackman, a lunatic, has presented his petition to court, asking leave to enter into a lease for certain coal underlying Jackman's farm in East Pike Run Township. Among the assets of the estate is 7 acres of coal underlying the house, barn and other farm buildings, which has heretofore been reserved. It is desired to continue the mining of this coal upon the payment of the regular royalty of 1c. per bushel, the coal in that locality yielding about 10,000 tons to the acre, or 275,000 bushels.

Rio Janeiro, Brazil—American consular agents lean to the belief that a profitable market can be found by American coal operators along the Amazon River, suggesting that the coal be shipped in barges direct from the mines along the Ohio and its tributaries. Such barges would find profitable return cargoes of rubber and other products. The Amazon River industries are entirely dependent upon the extensive steamboat traffic necessary for the collection and marketing of their products. The rubber business alone is valued at $50,000,000 per year.

Louisville, Ky.—The prolonged drought in the Ohio Valley, in common with that in the Middle West generally, has resulted in a stage of the river too low for the movement of the larger steamers, and as a consequence, the towboat "Strague," coming up from the lower Mississippi, and bound for Louisville with 35 empties, has been forced to tie up at Cairo. Recent more or less general rains, however, have helped somewhat, and a navigable stage may be expected soon, which will enable something like 3,000,000 bu. of coal now tied up at Pittsburgh wharves to move.

Hazard, Ky.—R. D. Baker, of Big Stone Gap, Va., with local capitalists, at Hazard, Ky., will soon begin the construction of a four-story office and store building in that city, and S. A. D. Jones, manager of the Racoon Coal Co., is planning the erection of a three-story office building on the site of his office building, which was destroyed by fire some time ago. The demand for office and other business space caused largely by the continuing coal development around Hazard, has made the present buildings inadequate, and those indicated are the first of a number which will be built.

COAL TRADE REVIEWS

GENERAL REVIEW

Bituminous prices showing a tendency to soften. Recent tension in the trade much relieved. Market well maintained in the face of a temporary sagging tendency. Undertone excellent. Anthracite a trifle more buoyant.

Both the wholesale and retail hard-coal markets have experienced a slight impetus during the week, due partly to the beginning of the return of the summer vacationists and the preparations for starting up furnaces. The middle of September will see the winter trade definitely under way and indications point to an active business throughout the season. Some weak spots are still found occasionally where one of the individual operators has been attempting to force the market by cutting the regular company circular. Such business is not meeting with much success, however, and the trade is holding generally firmer than the average for this period.

While the soft-coal market continues to maintain its excellent position, conservative observers believe they see indications of an easing up. Buyers are showing a disposition to hold off until September, with the result that prices have softened in spots and sellers, who were slow about taking business earlier in the season, are now beginning to look for orders. The tension has been materially relieved generally, and indications point to a slight temporary, though probably unimportant, sag in the market. On the other hand, it is still a problem in some districts to obtain sufficient coal, although it is clear that there is more in the market than for some time.

Mines in the Pittsburgh district have a moderately large supply of both cars and labor, and production is very heavy. Substantial premiums are being obtained for any spot tonnages available of which there are only a few odd lots; indications are that there will be considerable buying in the prompt market up to Dec. 1 by dealers whose requirements are not covered for this period. The Ohio docks continue loading Lake coal at full capacity. The steam trade in the state is holding remarkably strong, and the large interests are anticipating an advance on this grade. The market is firm in all directions and indications are bright for an active fall and winter business. Demand and prices at Hampton Roads continue firm, but the vessel tonnage has been light, with the result that considerable coal has accumulated in the yards; this situation will be relieved shortly, however.

The situation in the Southern market is much improved, there being less coal on track and orders for prompt delivery more numerous. The heavy cotton crop is having a stimulating effect on coal. In the Middle Western markets, one of the principal features is a deadlock at Chicago, due to the buyers refusing to meet the new high prices on the domestic grades. Supplies are still further reduced and an advance in quotations is anticipated the first of the month. At St. Louis screenings are heavy, while the domestic grades are ruling firm; practically no smokeless is coming in, and the car supply has only been about 50 per cent. requirements.

BOSTON, MASS.

Pocahontas and New River coming forward more freely. Shippers begin seeking orders. A dull period looked for. Pennsylvania grades quiet but firm. Anthracite shows good prospects for September.

Bituminous—There are signs that the market is already somewhat easier. Pocahontas and New River are coming down more freely, and practically all the shippers have now caught up with their old obligations. Receipts here have been very heavy the past week, the vessels and barges that were detained at Hampton Roads having now arrived in squadrons. The agencies that took only a minimum of business early in the season are seeking orders and prices at New England distributing piers have softened on that account. Loading despatch at the Virginia terminals is prompt, and at all points there is a decided let-up after the tension of a month or so ago; f.o.b. prices are now only 5@10c. up from the $2.85 contract figure, and the expectation is that spot coal will sag off within a short time to the season price. Meanwhile there is little inquiry and the disposition of buyers who did not cover their requirements in the spring is to await developments at least until September. The off-shore demand is good, and that will do much to keep the tidewater market steady during the dull period that is looked for the next fortnight or so.

A quiet tone is also observed this week with regard to the Pennsylvania grades. Prices are still firm, but it will be strange if they are not modified in response to the better supply of West Virginia coals. Those from Pennsylvania come to this market in relatively smaller shipments, however, and it may be they will hold their strong position so long as their output continues less than normal. Buyers who are "hedging" are likely to buy Cambrias and Somersets for hand-to-mouth supply and reserve their purchases of Pocahontas and New River until the prospect is better outlined. Georges Creek continues with a steady demand. The output is rather smaller than usual and thus far is being practically all applied to contracts.

Anthracite—There is more impetus to retail trade and the wholesale demand shows some improvement. The scarcity of broken coal is a feature and by some is regarded as serious. There is good prospect of an active market beginning in September, and doubtless full time will then be resumed at the mines. Some of the individual shippers are trying to force coal on the market at prices somewhat off the circular, but their efforts do not seem very successful.

Wholesale quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.15@1.55	$1.35@1.70	$1.67@1.77	
Philadelphia*	2.40@2.80	2.60@2.95	2.92@3.02	
New York*	2.70@3.10	2.90@3.25	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.95
Boston†				3.83@3.88
Providence†				3.90@4.00

*F.o.b. †On cars.

NEW YORK

Bituminous a trifle easier, but with an excellent undertone. Buying slightly restricted. A temporary sag seems to be developing. Hard coal now over the dull period and beginning to tune up for the fall and winter.

Bituminous—There has been a slight tendency to ease up in the local market during the week, although no specific weakness has developed. There is probably a little more coal at tidewater than has been on hand for some time. This tonnage could be easily moved were the sellers inclined to recede from their high price level, but quotations are being firmly maintained and production moderately restricted in the mining regions.

There is an increase in the demand at tide, but prices are not quite so firm as before. However, the outlook for the winter trade is excellent. Close observers are agreed that there is a strong undertone to the market and a large consumption seems to be assured. The railroads have done very little buying so far, and will be an important feature in the situation. The car and labor supply continue to be the controlling features. Labor is fairly plentiful, but the car situation is showing a tendency to tighten, particularly at some points on the Pennsylvania R.R. The market is not quotably changed, and we continue last week's prices as follows:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—The regular August dullness prevails in the hard-coal trade, with everything moderately quiet. However, the market has now gone through the two dullest months of the year in remarkably good form; in fact, in much better condition than in previous pears. Many of the summer vacationists are returning, and steam-heating plants are beginning to make preparations for starting up, with the result that there is already some activity. There will also probably be a small rush for coal at the end of the month by consumers anxious to stock up before the full winter circular goes into effect Sept. 1. Indications point to a good stiff business during the winter.

Stove coal continues to be in short supply, as has been the case all summer, and broken is now a close second. A slight temporary shortage is even reported in pea. Chestnut appears to be the heaviest and most difficult to move. The new Pennsylvania State tax on anthracite is still creating

a great deal of confusion and some uncertainty. The companies charging this tax to the buyers are placing a severe handicap on selling agencies; this increase is tending to scare away what little demand there has been.

We quote the New York market on the following basis:

	Circular	Individual—Lehigh	Individual—Scranton
Broken	$4.70	$4.45@4.85	$4.50@4.90
Egg	4.95	4.95@5.10	5.05@5.15
Stove	4.95	5.10@5.20	5.15
Chestnut	5.15	5.25@5.35	5.40
Pea	3.50	3.30@3.45	3.35@3.50
Buckwheat	2.75	2.15@2.45	2.55@2.75
Rice	2.25	1.70@1.95	2.25
Barley	1.75	1.30@1.70	1.75

PHILADELPHIA, PENN.

Anthracite has shown little sign of improvement. Shipments to Northwest are growing less, owing to storage facilities there being well filled up. Broken coal about the only feature to the market. Bituminous still continues strong, with prices firm, and coal hard to get.

The curtailed operations at the mines would seem to indicate that the near future does not seem to hold any prospect of any immediate increased demand for coal. As a matter of fact, the latter part of August finds the trade in this vicinity in a very lethargic condition. The large tonnages that have gone from this territory to the great lakes have about filled the storage places there, and for some of the sizes, the companies are finding themselves hard put to find an outlet. This applies particularly to chestnut coal; ever since the increase in the price of this size to 15 to 25c. over the stove, there has been a gradual falling off in the demand. Three or four years ago, the demand for this size was far in excess of the supply; as a deterrent, the price was doubtless raised, and it has had the effect of diverting the demand to other sizes. Pea coal was the natural substitute for those seeking a cheaper fuel, as witnessed by the heavy demand for this size during the winter months. The demand for broken coal is unprecedented, and while most of this grade moves on contract, it is almost impossible to secure any quantity at less than the full circular price, and even at that large orders are being turned down. It is unreasonable to suppose that the operators will work their mines for the production of this size, when the demand for the others is such that it means stocking, and as a consequence, the market is suffering. This may be ameliorated when the full mining starts in, but it is a fact now that the demand is far in excess of the supply.

Bituminous coal cannot be bought now at less than $1.25 at the mines, and one has trouble in securing supplies, even at the prices quoted. Operators are willing to name prices, but they persistently refuse to guarantee any deliveries, although in the face of this, it may be paradoxical to remark that there is reported to be coal on demurrage at tidewater. This is due, however, to the inability to secure transportation facilities. Water freights are way up, and tonnage scarce, and as the season for the resumption of anthracite activity approaches, the condition is not likely to improve.

BALTIMORE, MD.

Bituminous trade is strong, but coke demand has not responded. Congestion at the piers for brief time. Anthracite call is improving.

The bituminous trade is strong and in many cases the call on contract is now exceeding the supply. The problem still continues to be one of getting out enough fuel in the face of a labor or car shortage; in West Virginia cars were somewhat easier the early part of the week, but there was a tightening up toward the close.

The steel industry is showing good form, according to reports in coal offices here, but coke has not responded to the upward trend. Among the fuel that accumulated at tide during the week was considerbale coke that did not find ready disposal. Probably a thousand cars of coal were also tied up here temporarily, but were finally disposed of to an advantage.

One of the encouraging features is heavy demand for slack from the cement industry. Other industries are also asking for screenings and prices have stiffened so that little is offered at less than 70c.

The anthracite demand generally is improving. Not only are deliveries fairly heavy, but orders are being placed which assure a fine latter September and early October delivery.

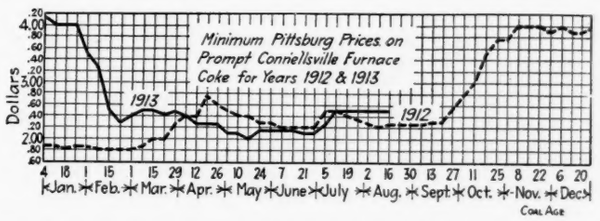
PITTSBURGH, PENN.

Extremely heavy Lake shipments. Slight car shortage. Little free coal, and fancy prices paid. Coke supply larger, but prices firm.

Bituminous—Coal shipments continue at the heaviest rate possible, with mines working very nearly full. More labor could be employed, but on the whole the supply is as good as it has been at any time lately. Several mines on the Monongahela division of the Pennsylvania lost time last week through car shortage, and a small wreck at the Conway yards made additional trouble. About 10,000 loaded cars are at the lake front. The car supply in general, however, is fairly satisfactory.

There is no free coal, except for occasional odd lots. Mine-run for spot shipment has brought $1.50 without difficulty, while 1¼-in. has sold to retail dealers at $1.75. The dealers were not eager enough to close contracts for the season, and many are indifferently provided. To take care of their trade up to December they will probably have to buy much coal in the open market at premium prices. It is practically impossible to shade 90c. on slack and despite the heavy lake shipments and consequent large production of slack there is very little being stocked, so that slack promises to command a premium in the winter. Reguar season prices remain nominally as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—There has been a plentiful supply of coke in the past week, shipments being better on contract, while it is relatively easy to pick up prompt and spot lots.


Minimum Pittsburg Prices on Prompt Connellsville Furnace Coke for Years 1912 & 1913
Dollars
1913
1912
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
Coal Age

Prices, however, remain absolotely firm and there is practically no prospect of the operators receding from their position of demanding $2.50 for furnace coke for any delivery. Demand has been very light since such furnaces as were not early covered for August made purchases for the month. In two or three cases there are negotiations on for September coke and for coke for the balance of the year, no prices being mentioned as likely under $2.50. Foundry coke continues very firm at $3 for both prompt and contract.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 9 at 392,825 tons, an increase of 7760 tons, and shipments at 397,362 tons, an increase of 31,309 tons.

BUFFALO, N. Y.

Still absolutely no coal in the open market. Contracts are being taken only when the seller obtains a concession from the buyer. Heavy movement, but market remains strong.

Bituminous—There is said to be rather more bituminous coal on the market than for some time, but not enough to weaken prices. In fact nobody appears to anticipate any weakness before the fall demand opens. There is all of the former complaint of slow work in the mines. The men have never before been called on to work steadily in summer and they cannot be made to do so now. On that account there are those who look for the coal prices to be no stronger in the fall than they are now, for the miners will go to work when the weather becomes unpleasant. On the other hand coal cars will become scarcer right along and the motive power of the railroads will be occupied with other freight, so that consumers will suffer if the consumption continues large.

It is a constant source of wonder that there is no coal on sale in the open market. Shippers who need a quick supply for loading lake vessels are often unable to buy enough to fill out their cargoes at any price. They sometimes offer more for the last of such a cargo than they are getting for it, but the coal is simply not to be had.

It is pretty certain that the consumers are going to be caught with small supplies this fall and winter, but they do not seem much disturbed about the situation and are merely running on a fine-weather schedule, apparently considering the reports of a coal shortage in midsummer as a device to sell coal on. The trade looks for higher prices and is obtaining them to some extent. The rule is not to take contracts unless something more than the current quotation can be obtained. Jobbers are not at all at ease over the outlook. They say it is going to be a difficult thing to buy coal on time and be assured delivery. The seller usually finds a better customer and makes some excuse for shipping the coal to him.

Bituminous quotations remain very strong at $2.90 for Pittsburgh select lump, $2.80 for three-quarter, $2.65 for mine-run and $2.15 for slack, with the latter stronger than for-

merly. The price of Allegheny Valley grades is about 15c. less than Pittsburgh.

Coke—There is a somewhat stronger feeling in all grades of coke. The efforts of consumers to cut the price down still further have not succeeded; producers maintain that prices are at the bottom and that they would shut down if they could not get present asking prices. Quotations are stronger at $4.60 for best Connellsville foundry, f.o.b. Buffalo and the Bridges.

Anthracite—There is a slight stir in the demand for anthracite, but it will be light until about another month passes. Shippers are still at sea over the Pennsylvania tax and consumers are holding off some on that account. The rail lines are doing a fair business, but all efforts are given to the lake trade, though some companies are running out of storage room at upper-lake ports. Shipments for the week were 210,000 tons.

TOLEDO, OHIO

Local trade anticipating an advance in quotations on the steam grades. Prices strong and the movement heavy. Docks loading Lake coal at full capacity.

Steam coal is moving remarkably well and is strong in price. In fact, nearly everybody connected with the coal business is looking for an increase in steam prices at an early date, both buyers and dealers alike. Domestic sizes for line shipment are also strong and there is no tendency toward weakness. There is more or less coal on track here which is being sold at less than circular prices to avoid demurrage, but this is purely a local condition and in no way indicates a weakness. Lake shipments continue strong and all the docks are busy loading coal as fast as the machines and men can work. Outside dealers are beginning to buy more freely and all express themselves as satisfied with the outlook.

Prices quoted here are as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.70	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.50	1.35	2.50	1.50	2.50	....	....
Nut	2.00	1.20	2.25	1.50	2.50	....	....
¾ lump	....	1.55	....	....	....	1.20	1.20
Mine-run	1.60	1.35	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

The local coal trade is ruling strong in every way. Demand good for all grades, and the new circular prices are well maintained. Steam business is increasing in volume, and the lake trade is still active.

The trade during the past week has been active in every direction. Domestic demand is good and is gradually increasing from all sections. Steam business is also active and the same is true of the lake trade. Taking it all in all, the market is in excellent condition and future prospects are bright.

Domestic trade is increasing in volume as the fall approaches. Many of the larger householders have placed their orders and the retailer is busy making deliveries. Retail stocks are not heavy, and with the constant drain upon them, dealers are compelled to place orders for supplies. Most of the orders now placed by retailers are for immediate delivery, although there is some business being done for delivery in September. Operators and jobbers are loath to book orders for business any farther ahead than September. School and municipal contracts are now being filled.

Lake trade is strong, although the growing car shortage is cutting down the volume to a certain extent. The demand from the Northwest is still good, and activity will undoubtedly prevail in the lake trade up to the close of navigation. The interior movement from the upper lake ports is going on steadily.

The steam demand is also one of the strong points to the market. Manufacturing plants are taking a good tonnage and the same is true of railroads. One of the strong points of the steam trade is the good demand for the small sizes, such as nut, pea and slack and coarse slack, all of which are advancing in price. The supply of steam grades is not large.

The output during the week has been curtailed to a certain degree by the growing car shortage, and it is estimated that the state produced but 75 per cent. of normal. The car shortage was the most pronounced in Eastern Ohio, many of the mines there being compelled to close down for a portion of the week. The situation was the best in the Hocking Valley district, but even there some trouble over lack of transportation facilities was reported.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburg	Pomeroy	Kanawha
Domestic lump	$1.70 @ 1.65	.....	$1.70 @ 1.65	$1.70 @ 1.65
3-4 inch	1.55 @ 1.50	$1.30 @ 1.25	1.45 @ 1.40	1.50 @ 1.40
Nut	1.30 @ 1.20	.....	1.35 @ 1.30	.....
Mine-run	1.35 @ 1.25	1.20 @ 1.15	1.30 @ 1.25	1.20 @ 1.25
Nut, pea and slack	0.70 @ 0.65	.....	0.70 @ 0.65	0.65 @ 0.70
Coarse slack	0.60 @ 0.55	0.75 @ 0.70	0.60 @ 0.55	0.55 @ 0.50

HAMPTON ROADS, VA.

Quite an accumulation of coal has developed at tidewater. A falling off in vessel tonnage. Market remains firm and prices stationary.

Dumpings over the Hampton Roads piers have not been as heavy as anticipated. Vessel tonnage was plentiful at the beginning of the week, but fell off completely toward the end and as a result there is quite an accumulation of coal in the various railroad yards. Contracted vessel tonnage due in the next few days, however, will greatly relieve matters and heavy loadings are expected during the next week.

The demand for coal inland has been fair and prices are remaining firm on both Pocahontas and New River grades, but there is little inquiry for Kanawha splint or gas coals as buyers seem to be well stocked with these grades.

Shipments both foreign and coastwise have been light. Foreign cargoes have been made to Genoa, Canal Zone, Jamaica and Rio de Janeiro.

LOUISVILLE, KY.

An abnormally heavy demand on the Kentucky operators. Producers cautious about further commitments. Car shortage developing and rumors of labor trouble are being heard.

The local market continues brisk, with the demand good on all grades and sizes. The eastern Kentucky operators, particularly, are experiencing one of the strongest demands in the history of the trade and are now inclined to be conservative about future commitments. There is distinct evidence that they are in fear of overselling and so are going very slowly in this respect. This unusual situation is due to an abnormally heavy demand, particularly from the North, and there does not seem to be any indication whatever of a letup in the consumption.

Another factor that may develop to serious proportions, is the persistent rumors to the effect that there are grave possibilities of labor troubles in the Jellico district, and other portions of the eastern Kentucky field. There are said to be a number of labor agitators in there, and there are many indications of unrest among the miners. In addition to this, operators have already experienced some difficulty in getting sufficient cars, and the situation in this respect promises to be serious before long. Shipments into Chicago are particularly difficult to negotiate, for the reason that the Louisville & Nashville R.R. positively refuses to accept consignments in their equipment because of the long delay in returning same. The heavy movement into the Northwest has taken a large number of cars, and even under the best conditions, the return of this equipment to the mining regions is slow. The new cars being supplied the roads do not seem to be relieving the situation materially.

Steam grades are unusually good in view of the fact that operations have been restricted in certain large consuming branches; operators and dealers are finding that they have none too much of this grade to meet the demand. The better grade eastern Kentucky screenings are in strong demand at 85 to 90c. with the western Kentucky at 55 to 65c., f.o.b. mine. Eastern Kentucky block is steady at about $1.85; block and lump, $1.60@1.65; round, $1.35@1.40, with a very strong demand from industrial plants for mine-run at $1.25. Prices are showing a strong upward tendency and September deliveries will take on a good advance over the above figures; new contracts are being uniformly made at an advance of 10c. over the last year's figures.

DETROIT, MICH.

Some further contracting at good figures. Demand for gas coals unusually strong. The railroad movement slow. Anthracite will advance Sept. 1.

Bituminous—Local wholesalers and dealers are expressing a great deal of satisfaction over the fact that the West Virginia labor situation has now been definitely cleared up. Indications point to a strong, active market, and dealers are anxious that the supply shall not be restricted. Several uncertainties in the situation have created an unusual activity in contract business, some of which for large tonnages, have been closed during the week; business in this line is particularly buoyant.

One of the unfavorable features in the situation is the apparent inability of the railroads affected by the Ohio floods to reëstablish normal conditions on their lines; from present indications, it is not at all improbable that the effects of this will be felt well into the winter months.

Orders for mine shipments, particularly for gas coal, are especially good; the minimum figure now quoted on Youghiogheny slack is 90c., f.o.b. mine, with only a little available at that figure; about the same situation is in effect on West Virginia gas coals. Several cars of slack, which were standing on tracks here a few weeks ago, have been cleaned up, and there are practically none of the smaller sizes in the spot market today. The Pocahontas grades are coming in slowly,

and continue to maintain their former strong position; most of these are apparently being shipped either to Tidewater or the upper lake ports.

The local market is quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.60	....	$1.75	....	....	$2.50	$2.40
Egg	1.60	....	1.75	....	....	2.50	2.40
Steam lump	1.40	....	....	....	....	....	....
¾-in. lump	1.35	$1.20	1.25	$1.25	$1.25	....	....
Mine-run	1.10	1.10	1.10	1.10	1.10	1.50	....
Slack	0.85	0.90	0.75	0.75	0.75	....	....

Anthracite—While hard coal seems to be coming in freely, the demand is unusually heavy, and indications point to a scarcity this fall and winter. Local jobbers state that prices will be advanced 50c. per ton on Sept. 1.

BIRMINGHAM, ALA.

The local situation has improved during the week. Spot orders more numerous and there is less coal on track. Coke a trifle stronger.

A canvass of the principal operators here shows that the trade is somewhat improved over last week. The amount of coal on track has been reduced and spot orders are coming in at an increased rate. The principal cause for the change is the increased shipping instructions from the oil-mill trade whose busy season will begin in September.

In the domestic grades of standard coals it is found that all mines are practically sold up on No. 2 lump and nut, but fancy lump is moving slowly and it cannot be said that the market has improved on this special grade. Reports from some of the dealers indicate that fancy lump is heavier than customary at this season of the year owing to the increase of 25c. over last year's prices on nearly all standard coals in Alabama, while the lower grades of lump coal are being sold at about the same level as in 1912.

Due to a better pig-iron market furnace coke is stronger, although it is not believed that the furnaces recently put out of blast will go in again in the near future.

NEW ORLEANS

High fuel-oil prices increase demand for coal. Yard room filled to capacity. Tap-line orders placed.

The high price of fuel oil is greatly increasing the sale of coal. With the certainty of a large cotton crop and the probability of a heavy yield of sugar cane both ginners and sugar-mill men are buying largely. Every foot of room in the regular yards of the companies handling Alabama coal is filled, yet there is no interruption in the movement to take advantage of cars while they are to be had.

Announcement that extensive rebuilding will be necessary on one of the locks in the Warrior River will delay the coal-carrying experiment of the Alabama-New Orleans Transportation Co. until mid-winter at least, it is thought. Whether the power barges, which are over 200 ft. in length, can handle coal economically down the small Alabama rivers is yet to be proven, although coal men generally are preparing to meet a lower price that is likely to develop with the perfection of the lock system in the Warrior River. Several orders were placed this week by lumber and tap-line railroads.

The New Orleans Ry. & Light Co. will place their annual contract for 150,000 tons of coal in the near future.

ST. LOUIS

Only a 50% car supply furnished during the week. Screenings continue a drug, but domestic grades are ruling high. Hot weather affecting the market.

The only thing that has prevented the coal market from soaring for the past ten days has been the continued hot weather. There was everything to keep the price up; the mines in Williamson and Franklin Counties worked two days this week on commercial coal, on account of the car shortage. The Iron Mountain operators fortunately got about three days and the same applies to the Illinois Central. This is about 50% of the called-for equipment, and if this condition exists now, it is an easy matter to figure out what it will be with 60 days.

Screenings are still a drug on the market, although there has been little change in the price. However, if there is a flood of equipment for a matter of a week, the price will drop. Franklin County operators are rapidly advancing, quotations being oversold on account of the shortage.

Anthracite is absolutely a drug in the St. Louis market, and chestnut is sold as low as $7.05, whereas the circular, including the tax, is $7.44. There are between 50 and 75 cars of chestnut due in the next ten days that have not been sold, coming in on speculation.

The same thing applies to coke, and there is practically no smokeless coming in at all. The indications are that there will be no change in conditions for the next week, unless it is an advance in the price of high-grade lump and egg. Standard operators are selling their coal at the cost of production.

The market is now quotable on the following basis:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	$0.95@1.00
3-in. lump	.....	.....	$1.30	.....
6-in. lump	$1.40 @ 1.60	.....	1.40	1.20@1.30
Lump and egg	.....	$2.10	1.40	.....
No. 1 nut	1.10 @ 1.20	.....	1.05	0.87½
Screenings	0.65	.....	.....	0.80
Mine-run	1.50	.....	.....	0.75
No. 1 washed nut	1.50 @ 1.60	.....	.....	.....
No. 2 washed nut	1.20 @ 1.30	.....	.....	.....
No. 3 washed nut	1.10 @ 1.15	.....	.....	.....
No. 4 washed nut	1.00 @ 1.10	.....	.....	.....
No. 5 washed nut	0.70 @ 0.75	.....	.....	.....

CHICAGO

Dealers refuse to meet the recent advance on domestic grades and buying has stopped. Further advance expected Sept. 1.

There is little activity in the Chicago market, so far as domestic coal is concerned, retail dealers, as a rule, refusing to purchase standard coals at present prices. Despite the fact that a car shortage is in sight and the coal supply will be decreased they contend that offerings at reduced prices will be made within a short time. On the other hand, the general trend of opinion among market observers is that there will be a sharp advance in the price of standard coals by Sept. 1.

It is also regarded as certain that a shortage in the supply of smokeless coal will soon develop. Smokeless mine-run is quoted at from $1.50 to $1.60 on the spot market and lump and egg is selling at $2.25 to $2.50 at the mines for spot shipment. An advance has been made by Hocking Valley operators on inch and one-quarter lump to $1.70 at the mines and on six-inch lump to $1.95, the mines. Coal operators in the Franklin County district are obtaining $1.60 at the mines for their product. Springfield operators have established a uniform price of $1.50 at the mines, so far as country sales are concerned. Concessions are being made, however, on Chicago shipments. There has been little change in the anthracite market, business remaining at a low level. Prices prevailing at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07@2.32	$2.45@2.65	$2.27	
Steam lump	1.92		2.07	
Egg	.....	2.45@2.65		$4.30@4.55
Mine-run	1.82	2.30	1.87	3.55@3.65
Screenings	1.32@1.37	1.60@1.75	1.32@1.37	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.75@4.85; gas house, $4.65@4.75.

PORTLAND, ORE.

Situation unchanged. Imports light, but will increase in the fall.

The market in domestic coal is quiet and prices have shown no change although the wholesale price to dealers on Utah coal advanced 25c. per ton, Aug. 1, as has already been announced.

Coal has not been imported here in very large quantities so far this summer and there is reason to believe the shipments will be rapidly increased with the approach of fall. As much of the coal will move over the C. W. R. & N. lines, the additional equipment ordered for them is of importance to the coal trade.

FOREIGN MARKETS

AUSTRIA

The Austrian coal production for the first half of the current year was as follows:

Year	Coal	Coke	Liguite	Briquettes—Coal	Briquettes—Lignite
1913	8,086,786	1,247,050	13,840,183	97,452	118,167
1912	7,605,151	1,115,561	12,747,064	83,042	116,138

FRANCE

The following shows the production of fuel in the Pas-de-Calais and Nord districts during the first half of the current year and last year:

	Pas-de-Calais 1913	Pas-de-Calais 1912	Nord 1913	Nord 1912
Coal	11,039,919	10,798,746	3,906,105	3,742,998
Coke	810,445	786,080	429,917	423,950
Briquettes	286,648	316,207	605,804	565,134

GREAT BRITAIN

Aug. 8—Despite holiday influences there is a good demand for all kinds of large coal, and prices continue firm:

Best Welsh steam	$4.80@5.04	Best Monmouthshires	$4.08@4.20
Best seconds	4.56@4.68	Seconds	3.96@4.02
Seconds	4.32@4.50	Best Cardiff smalls	2.46@2.52
Best dry coals	4.32@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for June, and the 12 months ending June 30, 1912-13, in short tons:

	June		12 Months			
Destination	1913	1912	1913	%	1912	%
Tidewater	253,448	307,023	3,531,202	22	4,324,397	24
East	192,316	152,020	2,549,552	16	2,164,960	12
West	1,067,682	1,074,797	9,221,463	57	11,105,871	62
Total	1,513,446	1,533,840	15,302,217		17,595,228	
Coke	30,015	20,811	315,474		236,518	
From connections						
Bituminous	91,617	16,578	729,741	5	214,703	2
Anthracite	1,794	1,673	15,746		35,228	
Total (except coke)	1,606,857	1,552,091	16,047,704	100	17,845,159	100

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Aug. 16:

	Week's Range			Year's Range	
Stocks	High	Low	Last	High	Low
American Coal Products	83	83	83	87	80
American Coal Products Pref	....	....	105	109½	105
Colorado Fuel & Iron	33¼	31¼	31¼	41¼	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	195	190	190	....	....
Island Creek Coal Com	53	51½	52	52½	47½
Island Creek Coal Pref	85	84	84½	82	80
Pittsburgh Coal	19¼	18¾	18¾	24⅜	14½
Pittsburgh Coal Pref	85½	83¾	83¾	95	73
Pond Creek	21⅜	20	20	23¾	16½
Reading	162⅜	158½	161	168¾	151⅜
Reading 1st Pref	....	....	86	92½	86
Reading 2nd Pref	88½	88½	88½	95	84
Virginia Iron, Coal & Coke	42½	42½	42½	54	37½

	Closing Bid	Asked	Week's Range or Last Sale		Year's Range	
Bonds						
Colo. F. & I. gen. s.f.g. 5s	96½	98	95½	July '13	93⅜	99½
Colo. F. & I. gen. 6s	103	106	107½	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	83	84¼	83	84	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92⅛	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅜	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	85¾	86½	June '13	86	87½
St. L. Rky. Mt. & Pac. 1st 5s	80	Sale	80	80½	73	80½
Tenn. Coal gen. 5s	99	Sale	99	99	99	103
Birm. Div. 1st consol. 6s	100⅜	101	100⅜	100⅜	100⅜	103
Tenn. Div. 1st g 6s	100⅜	102	100¼	July '13	100¼	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79½	80
Va. I. Coal & Coke 1st g 5s	92	93	92	Aug. '13	92	98

American Coal—Dividends of 3% payable Sept. 1 to holders of records Aug. 30. Transfer books do not close for this dividend.

FINANCIAL DEPARTMENT

Lehigh Coal & N. Co.

President S. D. Warriner, of this company, says under date of Feb. 10:

Results—The net revenue of the company from the various sources increased or decreased as follows: Coal decreased $444,047; canals decreased $45,814; railroads increased $1752; miscellaneous income increased $163,196; total net revenue decreased $324,913.

The increase of $163.196 in miscellaneous revenue is mainly accounted for by the proceeds of the sale of the collateral trust power bonds being placed at advantageous rates of interest pending the need of the money for construction purposes. Another large item making up this increase was the initial dividend of 4%, received on 5079 shares of capital stock of the Lehigh & Hudson River Ry. Co., held by your company.

Coal-Mining Department—Coal tonnage from lands owned and controlled:

Mined by company..tons	3,275,585	3,615,141	3,375,541	2,828,788
Mined by lessees	181,505	215,887	285,822	224,927
By Alliance Coal Mining Co.	88,067	39,645	.....	.....
By lessees of Alliance Coal Mining Co	71,776	130,334	188,492	134,264
Total commercial coal.	3,616,933	4,001,007	3,849,855	3,187,979

In addition there was consumed for power and other purposes at the mines 463,685 tons, making the total production from all sources 4,080,618 tons, against 4,515,906 gross tons in 1910.

The decrease in commercial production is accounted for mainly by the suspension of mining during April and part of May, pending negotiations with the United Mine Workers as to the terms of a renewal of the agreement which expired Mar. 31. The new agreement entered into provided substantial advances to the mine workers, and mining was resumed the latter part of May. Production was further curtailed by interruptions at several collieries which occurred in September and lasted for 19 days, due to trouble among the men over the question of union membership.

The decrease in production was general throughout the anthracite trade in 1912, as the official statistics show that the total shipments of anthracite during the year amounted to 63,610,578 tons, a decrease of 6,343.721 tons, as compared with 1911. The cost of mining increased on account of increased maintenance charges during the suspensions of work above referred to, as well as on account of increased wages and cost of supplies.

Market conditions were satisfactory during the year, excepting for the company's inability at times to supply the demand for its coal, owing to the suspension above referred to. The company sold its entire production during the year as well as its supply of stock coal. The tonnage sold was 3,646,431 gross tons, an increase of 58,967 tons compared with 1911.

Insurance and Coal Lands Sinking Funds—During the year the coal lands sinking fund has increased $51,434 and the insurance fund $17,580 from income on investments and interest on deposits, making the total amounts of securities and cash in these funds, Dec. 31, $1,082,565 and $488,639, respectively. During the year an exhaustive investigation was made into the operating and accounting methods, and, in accordance with the advice of certified accountants, your board are agreed on the wisdom of a policy of accounting under which there shall be established proper reserves for coal-lands depletion, depreciation of improvements, insurance, mining hazards and similar items entering into mining costs; and have, beginning with the current year, in accordance with this plan, transferred the securities and cash in the coal-lands sinking fund and the insurance fund into the general funds of the company, under appropriate accounts establishing the proper reserves, which will appear in the balance sheet for the year 1913.

Lehigh Navigation Electric Co. New Power Bonds—In January, 1912, the company received payment for and issued $3,000,000 collateral trust 4½% 10-year gold power bonds, due Dec. 1, 1921, which had been sold to provide for the financial requirements of the Lehigh Navigation Electric Co. in the construction of its power plant at Hauto.

The construction of the Lehigh Navigation Electric Co.'s power plant at Hauto, Penn., and the transmission lines radiating therefrom, is progressing rapidly. It is expected that the plant will be completed in the summer of 1913. The 38 electric companies chartered to operate in the several townships reached by the transmission lines were merged and consolidated by agreement dated Dec. 23, 1912, into a corporation under the title of the Lehigh Navigation Electric Co., and letters patent issued to the latter company under date of Jan. 6, 1913.

Extension of Lehigh & New England R.R.—The extension from Danielsville, Penn., to Tamaqua, Penn. (at which point connection is made with the Panther Creek R.R. of your company), some 32 miles in length, was completed and put in operation on July 8, 1912. The new line, in addition to proving a source of increased revenue to the railroad, affords a direct all-rail route to the Eastern markets as well as a physical connection with the main trunk lines.

Financial—Advances to Sub. Companies—The financial requirements of the Lehigh & New England R.R. Co. and the Lehigh Navigation Electric Co., in carrying on the work as above outlined, have been provided for by the purchase of their securities and by advances by this company amounting during the year to $1,754,766.

PRICES OF MINING SUPPLIES

THE MARKET IN GENERAL

The depth of pessimism, for the time being at least, seems to have been reached early in July and since then, there has been a steady gain in confidence among large business interests. Several reasons exist for this apparent sudden change of front, the principal one of which is the cessation of hostilities in the Balkan States with easier monetary conditions in France, Germany and England. It became evident, too, at about that time that the currency bill before Congress would not seriously affect American industries, and drive gold out of the country as was feared. After that, came excellent reports from the West regarding the crops, particularly wheat, which have stimulated enthusiasm, not later dampened by the deplorable shortage in corn, due to a severe drought in Missouri, Kansas and Oklahoma. The arrival of buyers in large numbers in New York from all parts of the country started business flowing in many channels, and their optimism was even more reassuring, for they told of excellent conditions at home, and how the consuming public of their section was in need of a large quantity of goods. For this reason, prices have not declined as it was feared they would, and while some readjustments have been made in the iron and steel market, these have been by no means general.

The steel situation shows little improvement. Steel companies are receiving orders for a larger product than was formerly the case, but at the same time their unfilled orders are decreasing, showing that plants are operating at a larger capacity than the country is consuming. There have been revisions in the price of wire and pipe and there will probably be lower prices for bars.

The market for metals shows a decided change for the better, and copper moved rapidly upward to 16c., while lead and spelter are likewise higher.

Business has apparently discounted any changes which are likely to occur through a revision of the tariff.

Labor

The situation has been much more peaceful. There have been few strikes of large import, increased pay for the railway trainmen still being under consideration by the Arbitration Committee, and the Paterson strike having fallen through. In other places, the demands of workingmen seem to be readily granted by employers when there is any sound basis for a revision. In some sections of the country, complaint is heard that there is a shortage of workers, this being particularly true of the agricultural districts where farmhands are needed, and in New England, where mill operators are needed.

Immigration statistics show a remarkable gain in the number of immigrants coming into the country. The figures for June, which were recently published, there being delay in all government publications of this character, show that 176,000 aliens came to the United States in that month as compared with 92,000 last year, 71,000 in 1911 and 105,000 in 1910. For the first six months of the year the number of aliens coming into the country numbered 650,000, in comparison with 478,000 in the previous year, 423,000 in 1911 and 615,000 in 1910. Ordinary outside labor commands $2 a day.

Iron and Steel Products

A further reduction in the unfilled orders of the U. S. Steel Corporation was recorded during July, amounting to 5,399,000 tons, a reduction since January of 2,500,000 tons. At the same time, the production of pig iron has fallen off only about 10,000 tons per day from the maximum, and now is approximately 82,000 tons daily. The mills are curtailing their output slightly, but not to any great extent, and there seems to be no accumulation of supplies.

Some reductions have been made, principally in wire products and in butt-welded steel pipe. Pig iron is slightly higher than a month ago, and the demand shows some improvement. The recently issued report of the American Iron & Steel Institute shows that the production of all kinds of finished and rolled forms of steel in the year 1912 established a new high record, the total output amounting to 24,655,841 tons. Of this, the production of iron and steel rails aggregated 3,227,000 tons; plates and sheets 5,875,000 tons, a new high record; wire rods, from which wire products are drawn, 2,653,000; structural shapes, not including plates, 2,846,000 tons; bars, skelp and all other forms, 9,908,000 tons. It is interesting to know that the iron and steel products exported during the fiscal year ending June 30, 1913, amounted to $340,000,000, setting a new high record and also a new high proportion to the total exports of 12.4%.

Pig Iron—The output of pig iron in the United States by blast-furnace interests during July was computed as approximately 82,000 tons daily. This was a reduction of 10,000 tons compared with the high figures reached in February, but even with the curtailment in the output, there was an accumulation of stocks of pig iron in many quarters. On the other hand, some extremely good buying was reported during the month, notably, heavy sales of Southern foundry No. 2 by furnace interests in that district which were willing to make concessions, and book business at a low figure. The principal interest doing this had a goodly tonnage ordered on its books at the end of the month, and was able to advance quotations $1 per ton. Since July 1, there has been an advance in pig iron in almost all centers, averaging approximately 50c. to $1 per ton.

Steel Rails—The leading trunk lines of the country have not begun to make up their buying schedules for rails yet, and very little business is being transacted. Rolling mills, however, are actively engaged in turning out products, and will be for the next several months. No change has been made in quotations, nor is it believed that there is any likelihood of a revision in prices.

Quotations are unchanged at $28 per ton for standard sections of bessemer rails, and $30 for openhearth rails, f.o.b. Pittsburgh. These represent a quotation of 1.25c. per lb. for standard sections weighing from 50 to 100 lb. per yd.; 1.21c. for 40- to 50-lb. rails, and 1.30c. for 16- to 20-lb. rails. In Chicago 16- to 20-lb. rails are 1.30c.; 12-lb., 1.33c. Relaying rails are sold at $24 per gross ton in Chicago and in New York at $22.50.

Track Supplies—The demand is no larger than it was a month ago, as far as new business is concerned, but shipments on old contracts are active, and most of the mills are working full time. Spikes are not at all firm at $1.80, and concessions of $1 a ton are frequently made. Track bolts with square nuts are $2.30 to $2.40 per 100 lb. These quotations are f.o.b. Pittsburgh. In Chicago, railroad spikes are $1.75 to $1.80; track bolts with square nuts, $2.30 to $2.40 and tie plates are $32 to $34 per net ton.

Pipe—There has been an unusually large business transacted in line pipe, and some of the largest contracts ever made have been closed this summer. These have been from the oil companies. At the same time, the demand for smaller sizes of standard pipe has fallen off materially. The revision as announced, which is approximately one point, applies only to pipe ¾ to 2 in. in diameter, butt-welded.

Discounts and net prices are as follows:

	Black	Galvanized
¾- to 2-in. steel butt welded	80%	71½%
2½- to 6-in. steel lap welded	78%	69½%
7- to 12-in. steel lap welded	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

	Cents			Cents	
	Black	Galvanized	Diameter	Black	Galvanized
¾-in.	2.30	3.26	5-in.	30.50	45.00
1-in.	3.40	4.83	6-in.	42.25	58.25
1¼-in.	4.60	6.60	7-in.	59.50	85.00
1½-in.	5.50	7.90	8-in.	62.50	89.00
2½-in.	12.90	17.80	10-in.	$1.03	$1.46
3-in.	16.80	23.30	11-in.	1.13	1.64
4-in.	23.00	33.20	12-in.	1.27	1.82

Sheets—Continued pressure has been brought to bear on the sheet market, but without obtaining concessions of more than $1 a ton from the rollers, and in some cases it was impossible for buyers to secure even this advantage. Production has been rigidly curtailed, and the American Sheet & Tin Plate Co. is operating only 68% of its capacity. Within the last fortnight, there has been much better demand and some heavy inquiries have been received by the mills, buyers evidently being possessed by the idea that prices are about as low as thy will go, and nothing will be gained by waiting. The following quotations are for small lots of a few

bundles or more, f.o.b. Pittsburgh and Chicago. The price for large lots is unchanged at $2.25, f.o.b. Pittsburgh, for No. 28 black.

	Cents per pound			
	Pittsburgh		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24	2.70	3.50	2.65	3.45
Nos. 25 and 26	2.75	3.65	2.70	3.60
No. 27	2.80	3.90	2.75	3.85
No. 28	2.85	3.95	2.80	3.90

Structural Steel—With the railways practically out of the market, as far as buying bridge material and cars is concerned, building work in the East extremely quiet, and little new structural-steel business in sight, there is no end of complaint by fabricating works that business is dull. Some extremely low quotations were made for work when there was any chance of securing the business. Structural-steel shapes are unchanged on a basis of $1.50, Pittsburgh, for plates, beams and angles, and in Chicago, $1.68 to $1.73. These prices are per 100 lb. in carload lots. Some recent buildings in New York were erected complete on the ground for about $50 per ton for the structural-steel work. Light material, such as roof trusses, would command considerably higher quotations.

Spiral Riveted Pipe—Prices are without change. The following quotations are f.o.b. factory, freight equalized with New York, being figured at a discount of 50, 10 and 10% from list. These are for orders amounting to approximately $250. For large orders, prices are cheaper by 12½ to 20½%.

Diameter in in.	Thickness Birmingham wire gages	Net price per 100 ft. With bolted joints complete		
		Plain	Asphalted	Galvanized
4	18	$19.76	$21.48	$30.74
5	18	23.40	23.70	37.14
6	16	33.05	35.76	49.73
7	16	37.58	40.76	56.82
8	16	43.17	46.80	65.00
9	16	50.06	50.10	74.22
10	14	66.42	71.08	96.15
11	14	71.20	76.57	102.24
12	14	83.75	89.15	118.30

WIRE PRODUCTS

Wire—After considerable irregularity, the mills made an open reduction in quotations. Manufacturers applied this reduction to all shipments made since Aug. 1. Quotations are as follows: Annealed fence wire in large lots, $1.50; galvanized barbed wire, $2.15; annealed, $1.75. These quotations are per 100 lb., f.o.b. Pittsburgh. In Chicago, plain wire is $1.73; painted barbed wire, $1.93 and galvanized, $2.33, these quotations likewise being for large lots.

Copper Wire—A steady increase in business has been noticed in the last fortnight, and some good buying is reported, principally from trolley companies who believe that the market has turned permanently. Much of this business has been placed on a basis of 17.50c. per lb. The copper situation shows a decided improvement, and the wire trade has not been as hopeful for several months as it is at present.

Wire Rope—Quotations for the smaller sizes of cast-steel wire rope per foot, f.o.b. Pittsburgh, are as follows: 1¼-in., 23c.; 1-in., 15c.; ¾-in., 10c.; ⅝-in., 7c.; ½-in., 6c.

METALS

Copper—The price of copper advanced steadily during the month, and by the middle of August 16c. was paid for Lake, and 15.75c. for electrolytic. This was largely due to a strike of miners in the Lake regions curtailing the output of Lake copper, but the strong statistical position of the metal also influenced buyers. European consumers continue to buy very freely.

Tin—The market is steadier than last month, and most of the time it hovered between 40 and 42c. per lb. The price of 42c. per lb. prevails at this writing for large lots.

Solder—Strictly half and half solder is cheaper, in accordance with lower prices for tin, and can be had at 25 to 26c. per lb.

Lead—The advance in the quotation made by the American Smelting & Refining Co. brings the retail price of lead in New York to around 5c. per lb.

HARDWARE

Nails—Prices are lower and wire nails can be had at $1.75, Pittsburgh, and $2.05, New York, for kegs of 100 lb., in large lots. Business is not active, but stocks are sufficiently large to meet the demand. For small lots from jobbers' store, $1.95 is quoted in Pittsburgh and $2.15 in Chicago.

Bar Iron and Steel—Business of dealers is active, as many consumers who often buy in carload lots from the mills are drawing on stocks at warehouse. Prices are steady, and from store may be quoted as follows:

Refined iron:	Per lb.
1 to 1⅞ in., round and square	2.10c.
1½ to 4 in. x ⅜ to 1 in.	2.10c.
1½ to 4 in. x ¼ in. to 5/16 in.	2.30c.
Norway bars	3.60c.
Soft steel:	
¾ to 3 in., round and square	2.05c.
1 to 6 in. x ⅜ to 1 in.	2.05c.
1 to 6 in. x ¼ and 5/16 in.	2.20c.
Rods—⅝ and ½ in.	2.15c.
Bands—1½ to 6 9/16 in. to No. 8	2.35c.
Beams and channels—3 to 15 in.	2.15c.

Extras for triple B (BBB)

3/16 and ¼ in.	2c.
5/16 and larger	1.75c.

Chain—Ruling quotations per 100 lb., f.o.b. Pittsburgh, are as follows:

3/16 in.	$7.50
¼ in.	4.95
5/16 in.	3.95
⅜ in.	3.40
7/16 in.	3.20
½ and 9/16 in.	3.00
⅝ and 11/16 in.	2.90
¾ and 13/16 in.	2.80
⅞ and 15/16 in.	2.70
1 to 1¼ in.	2.60

Extras for BB

3/16 in.	1.50
¼ in.	1.50
5/16 and larger	1.25

MISCELLANEOUS

Brattice Cloth—The reduction of price which was noted about the middle of July, has been followed by an advance, and prices are now as high as they have beeen at any time. Advices from manufacturers abroad are to the effect that market conditions there are very firm, and no reduction in price is expected. The demand is fully up to normal and stocks are sufficient to meet the inquiry resulting from this.

Portland Cement—Business has been steady, deliveries large, and the market is well sustained. The manufacturers of portland cement will have all the business that they can take care of for the next few months, but it is doubtful if this will last during the winter. In the East, the greater amount of business in New York in connection with the building of new subways is making up for the loss sustained in building construction, but elsewhere in the country, there has not been the same demand. Prices show no change. In Pittsburgh, the quotation is 90c. to $1; in Chicago, $1.25; Detroit, $1.34; St. Paul and Minneapolis, $1.45. These quotations are f.o.b., but do not include the cost of the package. In general, consumers have to pay about 40c. per bbl. for the package, also freight to destination. Quotation in Pittsburgh and New York is $1.58 with the usual allowance for bags returned, of 7½ to 10c. per bag.

Bars, Concrete Reinforcing—A reduction amounting to $1 a ton was made early in August. Quotations for small lots from Pittsburgh warehouses are as follows:

PITTSBURGH, CENTS PER POUND

	Warehouse Stock
¾-in.	1.95@2.05
⅝-in.	2.00@2.10
½-in.	2.05@2.15
⅜-in.	2.20@2.30

Asbestos—Building felt and sheathing, in small lots, is 3½c. per lb. for the light, weighing from 6 to 30 lb. per 100 sq.ft. and 4c. per lb. for the heavy, weighing from 45 to 56 lb. per 100 sq.ft.

Millboard sells at 5c. per lb. in lots of 100 lb. and over. This price applies only to sheets of standard size.

Miscellaneous Metals—Small lots of brass, bronze and other metals can be obtained in New York at the following quotations per lb.:

Bismuth	$2.25
Brass tubes, iron-pipe sizes:	
½-in.	.21
3¾- to 3-in.	.20
3½-in.	.20
4-in.	.20
Brass rods	.16¾
Brass sheets	.16⅝
Solder, half and half guaranteed	.30
Zinc sheets	.08¾
Manganese bronze rods	.16¾
Manganese bronze in crucible form	.15